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A JOURNAL DEVOTED
 TO BEES
 AND MONEY
 AND HOME
 INTERESTS.

ILLUSTRATED
 SEMI-MONTHLY

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No. 8

STRAY STRAWS FROM DR. C. C. MILLER.

THE SUBSOIL PLOW that costs least money of any I know about is sweet clover.

□ I WONDER if a thin section is not likely to be more uniform in weight than a thick one. [Yes, sir!—Ed.]

J. M. HICKS says that, 40 years ago, there were in Indiana 50 colonies of bees for every one now.—*American Bee Journal*.

□ J. E. FOWLER says, page 241, he intends to cut starters full size of the section, and fasten top and bottom. □ Better try it first on a small scale, friend Fowler, for I think they'll buckle badly, and the thinner the worse. [Yes, indeed.—Ed.]

A $1\frac{1}{2}$ -IN. SECTION weighs how much? 16 oz., when well filled, p. 231; $14\frac{1}{2}$ oz. ten pages later. The next man will give a different weight, and Aikin and Moll will give a different weight another year. You may as well give up first as last that there is *no uniform weight* for a section of a given size.

"SOME of the very people who at one time condemned footnotes to articles by the editor are now asking for them. . . . There will be more footnotes in future."—*Canadian Bee Journal, Editorial*. [I am sure our readers would almost unanimously vote for the footnotes. If for any reason, through a crowd of work on the part of the editor, they are left off, I hear from it.—Ed.]

FOUL BROOD. Col. Whipple reports as entirely successful a foul-brood cure he found in "Straws." Equal parts thoroughly mixed of pure carbolic acid and common pine tar; put two tablespoonfuls into a shallow tin box, with perforated cover under the brood-frames, and renew in three months if not cured.—*Proceedings Colorado State Convention in American Bee Journal*. [See answer to C. Davenport.—Ed.]

HERE'S MY POSTAL on that sweet-clover question, page 255. I've seen lots of sweet clover growing along the roadside where horses and cattle were allowed to feed, and it continued in health, but was never permitted to grow tall. And I've seen a few stalks in a pasture that were allowed to grow undisturbed, but I think it might have been different if there had been more of it so the stock would have learned to eat it.

"A $4\frac{1}{4} \times 4\frac{1}{4}$ SECTION in the flat is 17 inches long," says R. C. Aikin, p. 232. I got caught on that too. I know it *figures* 17, but it *measures* $\frac{1}{16}$ or $\frac{1}{8}$ less. Take your rule and see. [That is true; but I suspect that the majority of people do not know that there is this difference. It has to be less than 17 inches, or the section would be a trifle more than $4\frac{1}{4}$ when folded. The reason is, the fold at the V is not a sharp right angle.—Ed.]

YOUR FIGURES on page 232 must be amended, friend Aikin. You've taken off $\frac{1}{4}$ in. for thickness of wood, but you must take off also $\frac{1}{2}$ in. from thickness of honey for two bee-spaces. "A $3\frac{3}{8} \times 5 \times 1\frac{3}{4}$ has just a trifle more capacity in cubic inches than a $4\frac{1}{4} \times 4\frac{1}{4} \times 1\frac{1}{8}$," but it will hold about $\frac{1}{2}$ in. less honey, if $\frac{1}{4}$ in. is the bee-space. A $4 \times 4 \times 2$ section contains just twice as many cubic inches as one $4 \times 4 \times 1$, but it will contain just three times as much honey.

R. C. AIKIN is perhaps nearer right than the editor in thinking there's lots of cheating with light-weight sections; but he's wrong in thinking I produce only full weights. Of late I rather favor their being so light that the customer can't be fooled into thinking they weigh a pound each. [I am not going to say any thing more about light-weight sections; for somehow the more I say about them the more I am misunderstood. I suspect that, if we could get together and "argufy" for a while, we should find that we are pretty much all of a mind.—Ed.]

DOOLITTLE, in *American Bee Journal*, is rather down on outside diagnosis. He quotes one of the outside-diagnosers who talks of going out *every day* during early spring, in cold

storms, to place the ear at the side of the hive, and rap, to see whether they need feeding. Thinks he'd rather take frames out once than do all that every day. [So would I. I believe in outside diagnosis to determine certain conditions. When I want to make a sure thing of it I pull out a frame or two.—ED.]

WOODCHOPPER, what ails you? On p. 239 you've mixed up Danzenbaker with Doolittle, and think I'm off to cite a crack so big that bees could go through freely. No matter how big, doesn't that prove my point that the bees commenced storing before filling the crack? But you're wrong in thinking "they never stop up a crack that they can go through freely." They'll not stop up a crack that they *do* go through freely, but many a one that they *can* go through freely, and in the very case in hand they filled that $\frac{1}{2}$ -inch crack about half.

THE COLORADO STATE BEE-KEEPERS' ASSOCIATION passed a resolution denouncing supply-houses for changing "the present style of the standard $4\frac{1}{4}$ section to any other style."—*American Bee Journal*. [So far as I am aware, only two sizes of sections are standard—the $4\frac{1}{4}$ square and the 4×5 ; and even the last named costs 10 cts. per 1000 extra. Practically there is only one standard section on the market, and that is the $4\frac{1}{4}$ square. The sales of any other are as a drop in the bucket compared with the $4\frac{1}{4}$. Do not denounce the poor supply-houses just yet.—ED.]

IN REPLY, Mr. Editor, to your question how bees can walk up a perpendicular surface without a sucker, Cheshire says the pulvillus gives out a clammy secretion by which the bees *stick* on the glass, the pulvillus being thrown automatically into action when the claws fail to catch. After the bee has walked on the perpendicular glass for a time the adhesive material gives out, and the foot slips. High powers of the microscope reveal traces of the secretion left on the glass. [Yes, I remember Cheshire did say something about a secretion from the foot of the bee. Without taking time to look it up now, I am of the opinion that he also spoke of the little sucker that seems to be partially developed.—ED.]

C. DAVENPORT exposed to the fumes of bisulphide of carbon for 10 hours a piece of brood comb advanced with foul brood, then put it into a healthy hive, and it did not convey the disease. The fumes kill worms, moth, and eggs, but spoil the flavor of comb honey, and make it thinner.—*American Bee Journal*. [If bisulphide of carbon would always disinfect combs it would be a great boon for those afflicted with foul brood; but I question very much whether it would kill the *spores*. I should rather expect to find, in Mr. Davenport's healthy hive, foul brood in about three months' time, or about the time when the spores should have hatched,

and the active disease begun its work again. So far our own experience seems to show that nothing but actual boiling heat will kill the spores, although the bacilli themselves can very often be killed out by doses of carbolic spray.—Ed.]

"SYRUP made by boiling will granulate more or less," says F. A. Salisbury, p. 239. Yes, but only, I think, because it's thicker, not because it's boiled. Make the unboiled the thicker, and see if it doesn't granulate more. The bees operate chemically on the thin more than on the thick. [I suspect you are right; but heating water has a tendency to make it take up more sugar than it will hold when cold. If it is never heated at all it will take up only what it can hold. In making syrup, people are a little careless, sometimes, and get in too much sugar for the water; but they are not as liable to do this when the water is cold, for the very reason that they can not get in too much, because it will not hold it. What it will hold at a cold temperature it will hold right along. What the water will hold when hot, it will not hold when cold.—ED.]

THE VITALITY of the spores of *Bacillus alvei* is destroyed when exposed to atmospheric air for from 24 to 36 hours, according to Dr. Howard's book. Prof. Harrison, of Ontario Agricultural College, finds them uninjured at the end of six months, if kept in shade.—*Canadian Bee Journal*. [It is well known that sunlight is a strong germicide. If people would let the sunlight stream more into their rooms there would be fewer disease-germs in them. What if it does fade the carpet some? Faded carpets are much more to be preferred than pale children faded by disease. Perhaps the difference in the opinions of the two authorities as above given can be explained by saying that one contemplated sunshine when the other did not. In that case, both may be right. One thing I am sure of, however; if I knew positively that the inside of the hive contained the spores of foul brood I would not risk 24 or 36 hours of sunshine to kill them. While it *might* do so, I should greatly prefer immersing them for a few seconds in boiling water.—ED.]

HONEY IN PLACE OF SUGAR, FOR COOKING.

I wonder if our bee-friends know that honey can be used for every thing that sugar is used for. I never buy sugar to preserve. I use honey for jellies, jams, preserves, and butters. Fix your fruit, and cover with honey; set it on the stove to cook. You can put a cover on. I make jelly as usual on the stove. I also sweeten fruit to can, make gingerbread and snaps. I do not like it in tea or coffee. It is nice in fruit cake. Flavor highly to hide the twang.

A WOMAN BEE-KEEPER.



By R. C. Atkin.

HIVE-CONSTRUCTION; PRESENT DISCREPANCIES, AND THEIR REMEDY; A DIVISIBLE-BROOD-CHAMBER HIVE, WITH SUPERS AND BROOD-CHAMBERS OF THE SAME DEPTH.

In my article on "Sections; Size, Weight, Shape, etc.," in the preceding number, I spoke of our present hive system as being like trying to build a nice fine house, but doing it a little at a time over a term of years. Langstroth invented the movable frame—not to fit or work with any system or set of fixtures then in use—but a *new departure* to facilitate handling bees, and in a way altogether different from any preceding method. He did not have the two and one pound sections, but made a frame that, in general shape and size, would be convenient and still make a hive surface on top, giving large room for surplus boxes.

In the course of years came the invention of sections, or single comb boxes. They were a grand step in advance; but both the frames and sections were crude as in any new developments. Improvement has gone on until our hives, in point of workmanship and finish, are very fine.

Having adopted the L. frame and $4\frac{1}{4} \times 4\frac{1}{4} \times 2$ section, many devices have been resorted to to get the combination of brood and surplus apartments in the most convenient working order. We built a little at a time. As new features were added, the difficulty was to get the new additions to fit on to what we already had, and at the same time retain all the good points. Any one who has built a house, adding a room here, a porch there, at some other time a bay-window, etc., knows how expensive and unsatisfactory such a structure is. It seems to me this is just where we are in the matter of hives. The thing to do now is to commence anew, make a thorough study of the old structure to find its faults, then form into a new combination the valuable features in one harmonious structure.

The L. frame, in general principles, is a good one. A deeper frame of the same length would give too large a comb—more liable to break with heat or handling. Its length, when used in an eight-frame hive, makes the hive too long and narrow. A square house both conserves heat and saves material. The L. frame takes a chamber $18\frac{1}{4}$ inches long. Four $4\frac{1}{4}$ sections equal 17 inches; hence, when we put these sections over the L. frame we have $1\frac{1}{4}$ inches to

lag up in some way. If wide frames or section-holders are used we can fill the surplus room with their ends. Wide frames are undesirable. Holder-bottoms and pattern-slats must match the section-bottom, and even then two difficulties appear—sagging of the bottom, and slightly out-of-true sections. These two features make a lot of room for propolis. The T super has fewer objections on account of propolizing, yet the sections are necessarily loose or wide apart at the tops—corresponding to the thickness of the T's. This super is better than wide frames or holders.

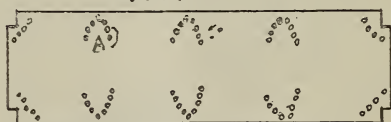
In the earlier days, the great object sought after was a knowledge of the habits of the bee, and to control swarming. Our hives were constructed more for that than any other purpose, the shape and appearance of the surplus honey being a secondary consideration. Research into the habits of the bee has brought that down to a science, and in such shape that we now can learn from books and journals what then we sought by personal observation and practice. Our great object now is to apply our knowledge in such a way as to make it yield financial returns.

Since, then, we are not now keeping bees so much to study their habits as to profit financially, and since this profit must come from the surplus-apartment, I deem it proper to put that first. Instead of fitting the super to the brood-chamber, I would fit the brood-chamber to the *best surplus fixture*. Having arrived at this conclusion, let us find out what is

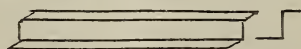
THE BEST SECTION AND SUPER.

In the previous article I discussed sections at length, and therein took my stand for a $4\frac{1}{2} \times 1\frac{1}{4}$ section, the sides $1\frac{1}{4}$ their entire length, and the tops and bottoms a trifle wider, their entire

FIG. 5



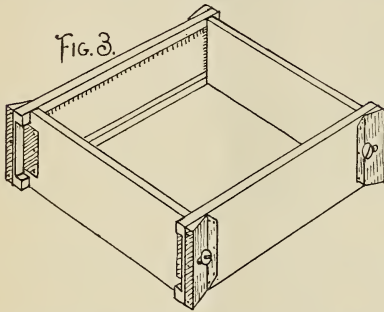
TIN AND WOOD SEPERATORS.



TIN SUPPORT.

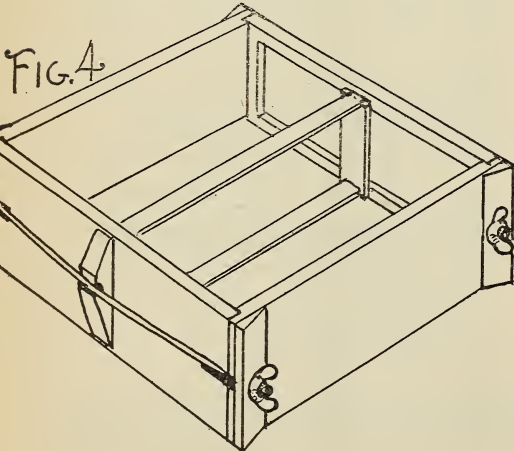
length, than the thickness of the *finished* comb. If the section be $1\frac{1}{4}$ thick, the top and bottom should be about two bee-spaces less in width than the sides, or $1\frac{1}{4}$ inches wide. Four 4-inch-wide sections equal 16 inches, the inside length

of my super. Being 5 inches deep, my super must be $5\frac{1}{4}$ inches deep. Eight $1\frac{3}{4}$ -thick sections equal 14 inches. I am going to recommend separators $\frac{1}{8}$ inch thick; and where the section uprights join the separator I will cleat it across with $\frac{1}{8}$ -inch cleats, so my separator will be $\frac{3}{8}$ inch thick where the section joins it, having a half bee-space in each face, between cleats. See illustration of wood separator in Fig. 5. Since I allow a half bee-space—count-



ing $\frac{1}{4}$ inch as a bee-space—in each face of the separator, I will cut down the thickness of my sections just that much. This will make my sections just $1\frac{1}{2}$ instead of $1\frac{3}{4}$. My super will then be 8 sections $1\frac{1}{2}$, plus 7 separators $\frac{3}{8}$, plus $\frac{1}{8}$ -inch strip on each super side, a total inside width of $14\frac{7}{8}$ inches. The super is to have adjustability in its width, so I have it $5\frac{1}{4} \times 15 \times 16$. Fig. 3 shows rim or body.

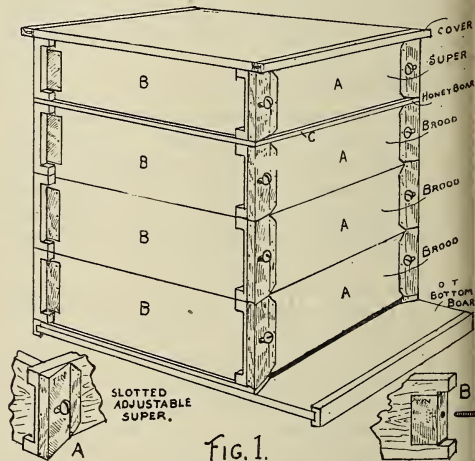
If one uses the tin separators, the sections should be $\frac{1}{4}$ inch thicker than with the cleated wooden one. If the cleated one be used with the thin section, when the sections are cased for market there will be only $\frac{1}{4}$ inch space between comb faces, whereas with the plain separator there is $\frac{1}{2}$ inch space. These thin sections will not require the case to be so wide by $1\frac{1}{2}$ inches in the 24-section size.



Our old hives have been so constructed that the brood-chamber could not be interchanged

with surplus fixtures, except when extracting. I purpose having brood-chambers, extracting-supers, and section-supers completely interchangeable, that the same body may be used for either. To accomplish this I make the brood and extracting frames just the depth of sections, and just as long as 4 sections, and close-fitting wide end-bar. See frame in Fig. 4.

The sections are supported in the super by the separators, the little spurs shown at A and B—see Fig. 5—being imbedded in the uprights of the sections, and all held there by compression, the compression being applied when the super is filled, and sustained while on the hive by the bolts, shown in Fig. 1, or by rods as in Fig. 4. The rod method, as in Fig. 4, is the original form as patented in the Aikin-Knight "K. D." hive. The bolt method, as in Fig. 3, is equally good, is neater, allows greater latitude in adjustability, and places the nuts and threaded parts away from wet and rust. The separators are longer than the net inside measure of the super, and reach past the sec-



tions into the inset or gain in the super ends, hence the compression has simply to hold the mass together, the weight being carried by the separator ends on the shoulder in the inset. The brood-frames are held in the same way, except that the tin support (see Fig. 5) hangs on the inset shoulder and under the frame end at the bottom.

This hive is a divisible-brood-chamber one, hive-bodies to be used as brood, extracting, or sections, at will. Taking out frames and tin supports, and putting in sections and separators, converts it from one to the other. Both comb and extracted can be produced at the same time.

SWARMING CONTROLLED.

My method of controlling swarming is by unqueening. This, with ordinary hives, requires removing queens, then nine days later removing all cells but one, or even all, and giv-

ing a queen. This ninth-day work comes after the honey-flow has begun—a busy time—and the labor increased, because of much honey in the combs. I propose to cut off that trouble by putting the queen excluding honey-board between the brood-sections ten days before the flow, and the eighth, ninth, or tenth day take away the chamber that has the queen and *open* brood, leaving the one with sealed brood and working force on the old stand with the sections on. Three or four days later I can give the old colony a ripe cell or virgin queen. You see I left them with only *sealed* brood, when I took the queen, so they could not build cells, nor can they till the young queen gets to laying, and by that time the brood is hatched, and they are just like a colony that has swarmed and reared a young queen of their own.

How long and how extensively have I used the "fixin's" here described? Of the principles, I have used nearly all of them—some quite largely. The complete hive, just as illustrated, has not been used. I have supported sections in this manner, used shallow frames in divisible hives, as shallow as $4\frac{1}{4}$ -inch frames; have tried both forms of compression—in fact, almost the entire thing. I know it will work.

Loveland, Colo.

[There is quite an advantage in having brood-chamber and super of the same depth; but there is the disadvantage that one brood-chamber is too shallow for many localities, and two (one on top of the other)—well, many don't like them for the reason that, for some operations, there are too many frames to handle for one brood-nest.

Mr. Aikin's method of supporting sections by means of the separators is a little like the plan advocated by Oliver Foster some ten years ago. The sections were supported by cleated separators, and the super sides were made to compress against the sections and separators by a locking-device at the corners; but I think he used the arrangement only a short time.

I should say the old clamping-device, as shown in Fig. 4, would be very much better than the new one shown in Fig. 3. The screw and tins in Fig. 3 appear to me to be too "flimsy." Moreover, they would always require the use of a screwdriver. The thumb-nuts in Fig. 4 could be worked by the fingers, and, when clamped, would be much more substantial. I believe Mr. Aikin would make a mistake to discard the thumb-nut and bolt arrangement that he has tried, for something he has not tried that has the appearance of being "flimsy."—Ed.]

THE EUCALYPTUS AS A HONEY-PLANT.

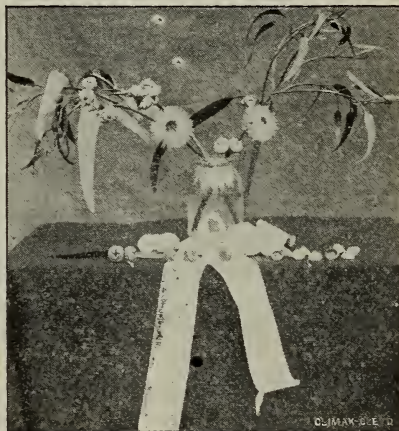
ITS VALUE TO BEE-KEEPERS AND ADAPTABILITY TO CALIFORNIA SOIL; THE CHARACTER OF THE HONEY.

By W. A. Pryal.

A quarter of a century ago the eucalyptus was a rare tree in California; but to-day it is one of the most common of the numerous foreign trees to be found here. Perhaps it might be safe to say that it outranks either the olive,

the grape, the lemon, or the orange; and we all know that these are extensively grown here, and have attained a world-wide fame by their productiveness in their adopted home.

Of the several hundred varieties of this genus of trees to be found in Australia, Tasmania, and sparingly in the Malay Archipelago, but comparatively few have been introduced into California. Of these the Tasmanian blue gum (*Eucalyptus globulus*) is by far the most common. The accompanying illustrations are of this tree



The engraving of the flowers of a gum-tree, shown on page 155 of the current volume of GLEANINGS, and therein described in the accompanying letter-press by Mr. J. H. Martin, is a variety that is rare in California, especially in the central portion, where the great majority of the gum-trees are grown, because of the more moist condition of the soil there. There are several varieties that are quite ornamental, among them being that described by the above-named writer. As briefly stated in previous issues of GLEANINGS, this genus of trees is interesting to bee-keepers on account of its being a prolific yielder of nectar.

A FEW OBSERVATIONS IN RELATION TO THE TREE IN GENERAL.

The trees (I am going to confine myself almost entirely to the red and the blue gum in this article, and when I speak of the tree it will be understood that it is of these two varieties, unless otherwise stated) grow to a great height. Some have been found in their native country almost as tall as some of the celebrated big trees of California. Some of the trunks of these tall trees have a diameter of from 8 to 16 feet. The wood of a well-matured gum-tree is very durable, and may be used for a variety of purposes. It is necessary to work it up as soon as possible, as it soon becomes very hard. When green, it is as easy to work as willow.

There are several peculiar things about the



THE EUCALYPTUS; THE HONEY-BEARING TREE OF CALIFORNIA.

gum-tree that are not found in other trees. We have all observed that, in the leaves of the trees we have about us every day (of course, some of us do not see many leaves in winter, which is not the rule in California and other favored parts of the earth), the upper surface is turned to the sun, while the lower side is facing the earth. In the gum, this is different. One of the edges of the tree is turned toward the sun, thus always exposing the leaf to the light. The color of the leaves is not of that green appearance that we are wont to see in the leaves of the trees we find in this country. The color is generally of a bluish or pearly-green hue. The leaves of the red gum are much greener than those of the blue, and do not have the gray color while young. Botanically they are what are called alternate, though in the young trees they are opposite, and of a more blue or pearl color. The first form is shown in the cut of the flowers; the latter is apparent in the young growth of shoots shown in the left of accompanying half-tone. Shoots that spring from the stumps of trees that have been cut down, or branches that have been severely trimmed, have the same characteristic of leaves as those of young trees. When the young trees have attained their second or third year they begin to put forth their alternate leaves.

I do not know of any tree that is easier to raise from seed than is the gum-tree. Of course, they will not stand a cold climate, and sometimes even in California a sharp frost is apt to nip the tips of the young plants. For this reason it is well to start the seed under glass in the fall, and in the spring transplant the little seedlings into shallow boxes, say 50 plants in a box 16x20 inches. When a foot high they may be set out where they are to remain. It is always best to set them out where they are to grow up into trees as soon as possible, that the tap-roots that the tree sends deep into the earth may give it that anchorage required to maintain aloft the large amount of trunk and branches that it may spread out.

For a long time it was thought here the tree would not self-seed in this climate. But since several generations, so to speak, of the trees have been grown here from seed from home-grown trees, it is now found that seed that falls upon any thing like fertile soil germinates and grows into thrifty trees. The finest growth of self-grown trees that I have seen is on the banks of the Temescal, where a hotel had been destroyed by fire. The heat of this fire killed some of the gum-trees that stood near by; but the trees, in dying, shed their seed that was in the seed-cones some little time after the fire, upon the debris of the ruined building. To-day the spot is covered with gum-trees fully sixty feet high, that sprung from the seed that thus fell upon the site of the burned hotel.

The trees shown in the half-tones herewith are about 20 years old. Those on the hill back of the house in the valley were planted by the late J. Ross Brown, the American humorist, traveler, and United States Minister to China. The tops of the trees in the left foreground are on the bank of the Temescal, and are fully 150 high. The scene of a bit of a gum forest is taken in a grove of 100 acres or so known as Rockridge Park, a private property in the hills east of Temescal. A clearing was made in that portion shown in the left foreground of the photograph a year before it was taken; but the cleared part was soon covered with a growth of young trees or "suckers" that sprang from the stumps that remained in the ground. The gum is like the California redwood in this, that it is a hard tree to kill unless it is rooted out.

By looking carefully in among the trees in the center of the photo, just above the upper fence, two cords of wood may be seen piled up. This forest is being thinned out so as to give the remaining "bean-poles" a chance to become good-sized trees.

Quite a trade is carried on in Alameda County by persons who cut and sell blue-gum wood for fuel. There is a company in Oakland that secures the leaves of these trees, and, by a patented process, converts the resinous and volatile liquid obtained therefrom into a preventive for the incrustation of steam-boilers.

I have found that the leaves and bark, especially the strips that the trees voluntarily shed each year, are an excellent fuel for bee-smokers. The aromatic odor of the smoke seems to have a salutary effect in quieting bees, and the odor is not unpleasant to the apiarist after he becomes used to it. The smoke of the leaves is recommended by physicians for the cure of asthma.

The numerous varieties of the eucalyptus have an extended period of florescence, and it may be possible to plant half a dozen varieties and thereby obtain a continuous succession of flowers the year round. Some varieties are said to bloom twice a year, though I have not noted any doing so. I have seen some blooming a few months after the tree last ceased its round of inflorescence. The two varieties common in the central portion of the State, the varieties already named, bloom for a good part of the year, and, as stated, at a time when honey-secreting flowers are most needed for the bees.

The blue gum, the flowers of which are shown in the illustration, usually begins to expand its petals or anthers in December, and I have known it to continue in flower for five months. One may well imagine the amount of flowers a tree 150 feet high will produce. At the writer's home on the Temescal, a few miles north of the city of Oakland, are several blue

gums and one red gum (the tops of two of the former are shown in one of the scenes in the cut) that are probably over 150 ft. tall. One of these trees has a diameter a little over 3 ft. As these trees will grow much taller for some time, they are beginning to fill out in girth. They are nearly 25 years old.

The flowers begin to open on the sunny side of the tree, beginning usually on the branches nearest the earth, and gradually extending upward and about the tree. The whole of a tree is never in bloom at one time; neither are all the trees of the same variety in a period of florescence at the same time.

The flowers of the blue gum are about 2 inches in diameter; those of the red gum, about $\frac{1}{2}$ inch; but they are much more numerous, and are borne in clusters of twos and threes. These flowers are rich in nectar. A gum-tree in bloom is a veritable paradise for bees. They just swarm amid the flowers.

Generally speaking, the chief aim of the bee-keeper is to sell his honey at the highest price possible. To do this his honey must approach nearly a water "whiteness." Yet there are times when honey is of more value to the apiarist than when it is of the character mentioned. This is true in a great measure of eucalyptus honey. The honey is, so far as I have been able to learn from experience, dark, and, when well ripened, thick. Its taste is aromatic and slightly unpleasant, partaking of the tannic and resinous properties of the fluid secretions of the body of the tree. This honey is said to possess medicinal virtues.

The value of this honey to the apiarist lies in the fact that it is produced at a time when his bees are generally sorely in need of winter or early spring stores. One of the greatest causes of loss of bees in this State is the open winters, during which time bees consume much honey, and have little or no chance of gathering any, owing to the want of a supply of native or other flowers at that season of the year. The eucalyptus is the only tree that flowers in California during this period, except the bay, or laurel, which is more of a pollen-producer, as it is not known to yield honey. For this reason the family of eucalypti is a boon to the California apiarist.

I do not believe that the honey will ever prove of any merchantable value to the honey-producer unless it is discovered to have some special medicinal properties. But as a means of keeping weak colonies from starving, especially where the owner does not feed his bees, and for promoting early brood-rearing, so that the colonies will be in strong condition when the harvest of light-colored honey is ready for the bees, the eucalyptus is of inestimable value.

Where the bees have been able, by being close to a gum-tree grove, to gather a surplus, it may become necessary to extract this honey in the

latter part of April, otherwise the bees may, as I have known them to do, carry this honey from the brood-chamber up into the supers.

I would advise bee-keepers in all parts of the State, where it is not too cold, to set out all the young trees of this great honey-producer they possibly can. Besides being valuable to them for the nectar it will afford their bees, they will find it valuable for shade, windbreaks, posts, fuel, and other purposes that will suggest themselves.

North Temescal, Cal., March 25.

HOW I SOLD HONEY.

SOME OF THE DISAGREEABLE FEATURES OF THE BUSINESS; A VERY INTERESTING ARTICLE.

By Alice Harding Crossman.

We had a large crop of honey on hand, and I felt sure we could sell a quantity at the house if people only knew we had it for sale.

I persuaded my husband to put up a sign, so he nailed up a large board on the gate-post, "Pure Honey for Sale, 10 cts. per lb." I was in ecstasy. Now I felt sure we should sell honey.

We lived on a main road not far from the city. I waited patiently for some one to buy honey. "It will take a little while to advertise," I surmised. It was delightful to imagine money coming in for honey.

My husband was away during the day, so I felt I had the business to myself. One morning, when I had the busiest day before me, and things seemed to pull backward any way that particular morning, my baby was sick and my head ached. But I was trying to hurry, when I heard a knock at the front door. I opened it, and there stood a little boy.

"Got honey to sell?" he asked.

"Yes, we have honey."

"Well, I want a dime's worth, but ain't got nothin' to put it in. I want to hunt bees." I hunted a can and gave him the honey. This took quite a while. When I returned to the kitchen I started with new energy at my work, when knock! knock!—some one else. I opened the door. This time it was a young man in hunting costume. He took off his hat and said, "I should like to get some honey."

He wanted thirty cents' worth to take on his trip. A few moments was taken in directing him. Then I went back to the kitchen. "Oh!" I thought, "I wish people would not come until I get my work done." I left the dishes, and prepared to churn, for the butter must not be neglected. I was just taking the butter from the churn, when there came a continued rapping at the door. I hastened to open it. An old man glared at me a moment, then said, "I see you have honey for sale."

"Yes, sir."

"Ten cents a pound?"

"Yes, sir."

"I want to see some of it."

"Very well; I will bring you a sample."

I hastened through the house on out to the honey-room to get some honey. "Why did a man leave his honey so far away?" Then I remembered I had never asked my husband to bring any sample honey to the house. I drew some and hurried back to the house, and found that horrid old man in the kitchen. I felt afraid of him, but bravely handed him the bucket of honey and a spoon. But he ignored that spoon, and sent a long brown finger down into that bucket. He stripped it to his mouth, smacked his lips, then dived into the bucket again. I could not stand that. I hastily drew the bucket away. After he had licked his finger clean he said:

"I want some of that honey, shore and certin; have you got any thing to put it in?"

I felt anxious to get rid of him. "Yes; we have buckets. I can sell you one."

"But I don't need any buckets," he said, glaring at me.

I then tried to explain that, if he would bring the bucket back, I would refund his money. He didn't seem to hear me. He was looking about him. I thought he had forgotten me, when he turned on me and said:

"You could put it in a jar, a glass jar, couldn't you?"

"Yes," I answered, not knowing what he was going to do. Without a word he stalked out of the house.

"Great Scott! what should I do?" I thought I would go and see what had become of him. I stepped to the front window in time to see the old man take a half-gallon Mason jar from his old buggy. It was filled with sweet milk. He hesitated, turned the jar around, and looked at it as if undecided. I stood and wondered what he was going to do. At last he had settled the question in his mind, for he removed the lid and tilted the jar and began to drink. I laughed aloud. It did look too funny. He drank half of the milk, then seemed undecided whether he could finish the rest. After looking all about him he scrutinized the jar again. After some hesitation he proceeded to empty it into the same gullet. I can never keep from laughing when I remember that sight. He was coming back to the house. I went to the door, thinking perhaps he would not come in; but, no—he followed me back to the kitchen. He spied the butter. He began to ask questions.

"That's shore fine butter. What do ye feed yo' cows?"

I told him.

"How many cows have ye got?"

"One."

"You didn't make all this yer butter off'n one cow?"

"Yes, sir, we have only one cow."

"How much milk did ye have?" he asked, tipping the barrel churn.

"I churn the cream; this is the milk, I said," pointing to a jar. "How much honey did you want?"

"Hey!" He looked at me, then continued: "Oh! you must be mistaken; you couldn't get that much butter off'n one cow."

"I will get your honey," I ventured to say.

After more quizzing he followed me out.

"That jar is clean," he protested, when I started to wash it. "Yes," he continued, "of course it's clean; it only had sweet milk in it." "But wouldn't it spoil the honey?"

"Wall, may be so; yes, wash it. Now fill it full," he said.

"It will hold fifty cents' worth."

"I don't care; I want it full."

After a long time I had the pleasure of seeing him get into his buggy. It was after twelve o'clock. The baby's fever was high, but I hurried as fast as I could. Company came in directly after dinner. As they were leaving I fancied I could get something done. I was hardly at my work when I heard a knock. Two well-dressed ladies this time.

"Will you come in?" I asked, as they did not state what they wished. I noticed they had a small five-pound lard-bucket. They entered the parlor.

"We came to see about buying some honey; have you nice honey?"

"Yes, we have extracted honey."

My fancy took up the theme. Now I was going to sell, oh! perhaps a great quantity."

I tried to look as sweet as honey, as I was so very glad I was about to sell some. I would show my better half that it wasn't "useless" to put up a sign.

"Let us see some of your honey," one woman said.

I hastened out and brought back a sample. They tasted, and bragged and commented. Oh, I was so delighted! I was thinking what I would tell my husband. They tasted again, then fell to discussing how much they would take.

"You can get some this time, Lura, and I will get some next time."

"Well, all right," Lura answered.

"We will take ten cents' worth. I brought a bucket."

My feathers fell. When I came back with the honey they were looking at the photographs, and every thing in that room was examined. Supper-time was at hand. Why didn't they go? I found they were in no hurry. I felt desperate.

"You will have to excuse me; my baby is sick, and I have my work to do," I said, rising from my chair in what I intended for a very suggestive manner.

"Certainly," they both said.

"Is the baby much sick?" Lura asked.

"I declare! I never dreamed you had a child, you look so young."

"I am not old enough to have very much sense."

"Oh! you really look so young; don't she, Ida?"

I looked around me.

"Yes, I can't do my work and entertain company at the same time." I had no thought of leaving these two women in that room alone. "My husband is coming. I think he will want his supper."

"I expect we had better go, Lura," Ida suggested.

With much adieu they departed. I wished I had been a large commanding figure about that time. I felt I would at least make people understand I was not playing housekeeping.

"What success?" the partner of my joys asked when he came in.

"Not much success, but I guess it will be different to-morrow."

When I told him about the old man and the jar of milk we had a good laugh together.

I will get a good start in the morning, before any one comes; and I did get the dishes washed when I heard a loud knock. I hastened to the door. "I want to get some honey."

"Yes, sir; come to the honey-house."

The man followed, saying, "I am in a hurry."

He sampled the honey, and bought a dollar's worth. I was filled with new hope. I reached the kitchen. A knock? Yes. A girl wanted a pound of honey. She came in and kept me from my work. It was not long until I opened the door and found a peddler. He tried to sell me soap, or exchange for honey. At last I shut the door in his face.

To be continued.

DRAWN COMBS.

COMB AND WAX; THE MELTED-BUTTER ARGUMENT SIFTED; THE HEAVIEST BLOW AT THE COMB-HONEY MARKET.

By C. C. Miller.

If I remember correctly, it was A. I. Root who first advised taking a super or one or more sections in which bees were at work, and giving them to another colony that was slow at getting to work in sections. Bees and all were to be taken. Then I think it was G. W. Demaree who said bees would start work in supers if in the supers were put a section each that was partly filled with honey, no matter when it had been filled, and no bees need be given with it. Possibly I misunderstood him as to the necessity of having honey in the section; but that was the way I understood it, and it was not for some time that I discovered, perhaps accidentally, that neither bees nor honey was needed. All

that was necessary was to have sections containing comb that was partly or wholly drawn out, and from that time I have always used one such in the first super of the season given to each colony, giving such section the name of "bait" section, or merely "bait."

At one time there was a wide divergence of opinion as to the advisability of using unfinished sections, some insisting that the bees would commence on the raw foundation and fill and seal the sections before the baits were filled, that the honey was of poorer quality in them, and so on. The character of those making these objections was such that there was no doubting that in their cases the objections were well founded. The one objection I can easily understand; for if in the bait the least speck of honey from the previous season is left, the granulation will affect the new honey stored. That the bees would be slower at filling the bait sections than the other ones, I can not possibly understand, unless it be that the sections had been left on the hives unused so late in the season of the previous year that the bees had varnished the foundation or comb with propolis. I have, unfortunately, had a large experience in deciding which sections would be sooner accepted and filled by the bees. In different years of failure of the honey crop, I have put on supers containing bait-combs, and the baits have been filled and sealed, and the sections with foundation left untouched. Not merely an occasional case, but hundreds of them. Just the one section in the super was filled and sealed, and the others left as empty as when put on.

I have seen it stated that, when unfinished sections were used, they should be cut down or leveled down until the cells were not more than $\frac{3}{8}$ of an inch high, the idea being entertained that B. Taylor used his Handy comb-leveler simply for the purpose of having cells not so deep. I think this is an entire mistake. I am not positive about it, but I *think* Mr. Taylor used the leveler for the sake of removing any objectionable part, no matter how deep the cells might be. If unfinished sections have combs that are drawn out full depth, there will be a variation as to depth; and when these sections are used over again there will be places where the comb will come so near the separator that the bees will bridge between. So the comb is leveled down enough to avoid the possibility of having the sections thus spoiled.

Another reason for leveling down, and the principal reason, perhaps, is that the unfinished sections are those generally that have been on somewhat late in the season, when bee-glue is plentiful, and having been left on for at least a short time after the cessation of the honey-flow, the bees have laid a rim of glue about the mouth of each cell. Such sections would be unfit to use without first removing this rim of glue, and the removal is quickly effected with

the leveler. Except for these two reasons I would not cut down the depth of the cells. If it's a good thing to have the cells built half, it's a better thing to have them entirely built out. For bait-combs I always prefer those built out as much as possible, only so they are perfectly clean and white, and will not come close enough to the separators to be bridged.

It may be said that, with such deep cells, the honey will not be evaporated so quickly as in those more shallow, and there may be a very little in this. But if that is any argument in favor of cells $\frac{3}{8}$ rather than $\frac{5}{8}$, it is equally an argument in favor of $\frac{1}{8}$ rather than $\frac{3}{8}$.

The question as to how much more honey could be secured by having drawn sections than by having merely foundation is one not easily settled. Great difference of opinion prevails as to the difference between the amount of comb honey and extracted from the same colony, some saying nearly the same, and some saying three or four times as much extracted as comb. Whatever the difference may be, it seems there ought to be nearly as much honey obtained in drawn combs in sections as of extracted. If the cells are of the same depth in each case, and the extracting-combs are sealed before extracting, there ought to be no difference.

Interest in this whole matter has been freshly aroused by the advent of the new foundation with side walls $\frac{1}{4}$ inch deep or less. I confess that I have not been so enthusiastic as some in thinking this new product will be of such immense advantage.

A year or so ago I received from Germany a sample of comb made by machinery, the cells being of full depth, and German bee-journals seemed quite jubilant over it. It was so heavy that there was no thought of using it in any thing but brood-combs; but it took so much wax as to make a brood-chamber full of it rather expensive. So little has been said about it since, that I doubt if it has gone, or, indeed, ever will go, into general use. The sample I have received from The A. I. Root Co. is a marvel of delicacy compared with the German sample, yet before we know how much advantage it will be we must know at what price it can be had, and it must be fully and fairly put to the test.

There is probably no question that, in general, bees will store more honey in old combs than in combs that must be wholly built as the storing is going on. And the nearer we come to furnishing complete combs, the more we help the storing. But cells $\frac{1}{4}$ or $\frac{3}{8}$ deep will not be as much help as cells of full depth. Even if wax enough be furnished to make full-depth cells, it isn't easy to figure how much the drawing out will cost the bees.

Again, it is a problem whether under any and all circumstances the bees will thin down the cells to natural thickness. While in some cases

it might be profitable to pay \$5.00 a pound for drawn comb to be used as bait, a single section in the first super of the season, it by no means follows that it would be worth any such figure to fill the whole super. After the first super, bait is perhaps of no value; for when an empty super is put under one partly filled, there is no trouble as to bees commencing promptly to fill the empty super if they have any thing with which to fill it. All these things must be taken into consideration in trying to settle upon the real value of the new invention.

Another thought presents itself. Suppose every thing goes according to or beyond the highest expectation of the most sanguine, and just as much comb honey can be produced as extracted, comb honey not requiring the special skill for its production that is now required, the producers of extracted honey will largely turn to the production of comb honey. That will lessen the amount of wax thrown on the market, increasing the price of foundation, and the greater amount of comb honey will at the same time lower its price. Will those two changes be a distinct advantage to the present comb-honey producer?

While I think it wise to look on all sides of the question in considering what may be the real value or lack of value to bee-keepers, of foundation having side walls much higher than at present made, and while I think it may be wise to be somewhat conservative in one's expectations, I do think one ought to be entirely fair; and some of the objections raised seem not only unfair but against the real interests of bee-keepers. It might be fair to say, "I don't believe it will do to give bees side walls of greater depth than are now given, for they can not be made as thin as the natural comb, and I'm afraid the bees will not draw them out to the natural thinness," but such an objection, uttered by any fair-minded person, would be followed by the remark, "But it is certainly entitled to a trial; and if, upon trial, we can have by its use just as good comb honey as we now have, then I can have no objection to it." But that isn't the way the matter is treated. The *Review* and *Progressive* teach that the great objection is to the material used.

Let us look at the argument of the *Review*. "Comb, natural comb, is of a light, friable nature — like the feathery, new-fallen snow." Now, that reads quite smoothly, and, taken with what follows, would make a novice think himself imposed upon if a bit of foundation in comb honey were imposed upon him. But it is misleading, and I can not help wondering that W. Z. Hutchinson, a man whom I look upon as remarkable for his fairness, should be led into such sophistry. Natural comb is "light." Per contra, we are to suppose that foundation is "heavy." Cut a piece of the side wall of a comb, and then cut a piece of the side wall of

foundation of the same shape and size in every way, and isn't one as light as the other? How much more friable is comb than foundation? "Friable," according to the dictionary, means "easily crumbled or pulverized." Natural comb, dried with age, becomes brittle and friable; but freshly built comb, at summer temperature, is soft and yielding—pliable rather than friable. I doubt whether there is a perceptible difference in the friability of fresh comb and fresh foundation. Both become more friable with age.

"Once this snow has been *melted*, it can never be restored to its former state. . . . In a like manner, once comb has been melted into wax, its character is changed. It is no longer comb, but *wax*." Is it possible, friend H., that you don't know that freshly built comb, made entirely by the bees, without any intervention of man, is *wax*, and nothing but wax? "Butter is butter; but melted butter is grease; so comb is comb, but melted comb is *wax*." I suppose in the strict sense of the term that butter, either melted or unmelted, is grease; but probably the word is here used to stand for something objectionable.

Since writing that last sentence I have had my dinner, and had three kinds of butter—some that had never been melted, some that had been heated just enough to melt it, and some that had been thoroughly heated for some time, and kept above the boiling-point. Tested separately, the last had a distinct cooked taste; but on bread I don't know that it could be detected; and the sample that was merely melted had no change that could be detected. All were excellent; and, living in the heart of the Elgin butter region, I think I know what good butter is. I wonder, when friend Hutchinson quoted that sentence, whether he stopped to think what melted butter really is like, and whether he had often sampled it. Did he ever eat hot biscuit, butter, and honey? If he did, he surely ate *melted* butter, or "grease," as he calls it. Did he never eat melted butter on hot toast, beefsteak, in cake? Do his folks cook asparagus, green peas, and all other vegetables without melted butter? When he eats butter on his potato, does he always manage to keep the butter unmelted?

Now I'll tell you what I think. I think when he used melted butter as an illustration he supposed he was giving an excellent illustration of the difference between wax unmelted and wax after it had been melted. And so he was. And he also thought that the melting materially injured each article. Prejudice in case of the butter, prejudice in case of the wax. Now if he is allowed to sample a piece of bread on which is spread butter that had once been melted, and another piece spread with butter never melted, I don't believe he could tell which was which. Neither do I believe he could detect any differ-

ence in taste between a piece of comb honey whose wax had all been melted and one whose wax had never been melted. Of course, I assume that the cell walls should be equally thin in each case, the possibility of which he admits.

The *Review* speaks of "comb honey with its delicious, fragile, toothsome, flaky comb." First and last there has been a good deal of that sort of talk, which, carefully analyzed and properly classified, would probably come under the head of nonsense. Comb is fragile, whether made of melted or unmelted wax; but is it "flaky"? I never saw any of it flake apart; did you? Does the pleasure of eating comb honey come from the honey, or is it the wax that is so "delicious, toothsome"? Here's a section of honey that was cut a day or two ago, and cut in such a way that a good part of the liquid has drained out on the plate. Do you find the drained honey on the plate so insipid that you cut some of the comb that now contains no honey, in order to make the honey "toothsome"? Or if you cut off a piece, do you prefer to cut from the part mostly drained so as to have a larger proportion of the "delicious" flavor? Isn't it a little strange that an article that passes through the digestive organs unchanged, and that is not in the slightest degree affected by strong sulphuric acid, should yet be so "delicious, toothsome"?

But after being melted, this delicious, fragile, toothsome, flaky comb is nothing but "tough, leathery, gobby wax." More than that, not content with being an "abomination," as the *Review* puts it, in and of itself, according to *Progressive* it takes unto itself horrors not of its own originating, in passing through commercial centers. It has consorted with "tallow that has been rendered from animals which have died from disease," and "has a lot of this filthy grease adhering to it. When this wax is melted, this filthy grease that adheres to it while coming in contact with sheep pelts that have been skinned from the bodies of sheep that have died of disease, and the filthy tallow and soap-grease aforementioned, will become a part of it."

Now, suppose there are furnished to the bees cells one-fourth or one-half inch deep, and a consumer has read what is said in *Review* and *Progressive*, have you any idea that you can get him to put such comb honey into his mouth? You say, "No, and he ought not to put it into his mouth." Well, then, I go to him and say to him, "I don't use manufactured comb; I just use foundation such as all comb honey generally contains. It's made of the same kind of material as that other fellow's, but there's only half as much of it in a pound, so you'll have to eat only half as much nastiness." Do you suppose he'll buy an ounce more of one than the other?

Now brethren, in all honesty, if the material

used is half as bad as you have painted it, is it right to use comb foundation at all? After we have gone on all these years filling our sections with full-sized sheets, why have you not lifted up your voice against it before? If it was all right to use a certain amount of it, why does the *character* of the material become so very objectionable when it is proposed to double the amount used? If the material is as bad as you say, then let us know it, and let us as honest men use not even the smallest starter in sections.

I am not specially interested in the new product; but along with thousands of others I am interested in the market for comb honey, and I am sorry to say that I believe you have done your share toward striking the heaviest blow at the comb-honey market it has ever received; and this, even if not the slightest change is made in the foundation used. For what you say, if it applies at all, applies to the thinnest foundation that may be made, even without any side walls at all; and let a belief in what you say get a lodgment in the minds of consumers, then good-by to the market for comb honey.

Marengo, Ill.

[See Editorials.—Ed.]

DRAWN COMB DEFINED.

DEEP CELLS, AND THE ADVANTAGE OF SHALLOW CELLS.

Dr. C. C. Miller:—I believe you are our lexicographer of words pertaining to bees and bee-keeping, and I wish to appeal to you for a definition of "drawn comb." The editor of *GLEANINGS*, in the Feb. 1st issue, defines: "Drawn comb—comb that has been leveled down to cells about $\frac{3}{8}$ of an inch deep." Two other writers, following, seem to agree with this definition. The third writer appears to make a distinction between "drawn comb" and "bait comb." They all refer to *natural* comb made by the bees, and cut down. I don't exactly know how cutting it makes "drawn comb" of it. My idea of "drawn comb" heretofore has been that, when artificial comb foundation was given to the bees, it was drawn out (lengthened) without addition of new wax, or very little of it, and became "drawn comb." If the former definition is correct, what are we to call the last product? Is it proper to call any natural comb "drawn comb"? I have not seen your new dictionary. I have only Webster, and find "drawn butter," but no "drawn honey" nor "drawn comb."

THADDEUS SMITH.

Pelee Island, Ont., Feb. 15.

[Dr. Miller replies:]

I don't assume to be lexicographer for the bee-keeping fraternity, having been chosen to

say in only one book what was the customary usage of bee-keepers. I have some doubts whether I know enough to clearly define "drawn comb." I think I could point to a specimen and say clearly, "That's drawn comb," and then to another, saying without hesitation, "That's comb foundation." But I'm not so sure that I could clearly draw the line between foundation and drawn comb. As the word is ordinarily used, I think all comb is called drawn comb. Ordinary comb foundation is not called comb, but foundation. Give a piece of foundation to the bees, and when they have drawn out the side walls to the depth of $\frac{1}{4}$ inch we should probably agree in calling it drawn comb, although we would not call it so when they have just commenced nibbling on the side walls. Just at what point to begin calling it drawn comb is something like deciding on what day we are to cease calling a human being a boy and call him a man. I think the term "drawn" generally adds nothing to the meaning, but is used to give emphasis to the distinction between comb and comb foundation. In a super I put a bait of comb, and you can hardly misunderstand that expression; but by way of emphasizing the fact that the bait section contains comb and the other sections only foundation, I say the bait contains "drawn comb." I should say that the term as used by bee-keepers applies to all comb, whether the cells be two inches or more deep or very shallow. You see I'm a little careful to say "very shallow," without giving any exact measurement. I should also say that the term "drawn" has no reference to whether the sample is natural or artificial.

The editorial remark to which you refer is probably the one on page 78, "What I mean by drawn comb is some that had been leveled down to cells about $\frac{3}{8}$ in. deep." Evidently the editor did not mean that as a definition of the term, but simply as explaining the particular kind of drawn comb used in that case, and exactly the same idea would have been given if he had said, "The drawn comb used had been leveled, etc." If he had meant it for a general definition he would have used "has" instead of "had," saying, "What I mean by drawn comb is that which has been, etc."

Messrs. Crane and Snell, to whom you refer, hardly limit the word to comb with cells only $\frac{3}{8}$ deep; indeed, Mr. Snell expressly speaks of drawn comb $1\frac{1}{2}$ inches thick—that is, having cells $\frac{3}{4}$ inch deep. Mr. Crane thinks drawn combs should not be used with cells more than $\frac{3}{8}$ deep, but that does not say they would not be drawn comb before cutting down. Mr. Schæffle makes a distinction between "drawn comb" and "bait comb" in the heading of his article, but I suspect that heading was written by the editor. Between the two I think there is no possible distinction as to kind. Every

bait comb is drawn comb, and every drawn comb may be used as bait. But there is a distinct difference as to *use*, and I suppose this difference was in mind in writing the heading. Every drawn comb may be used as bait comb; but unless so used it would not be bait comb.

I may remark, in passing, that, while I should prefer bait combs with cells deeper than $\frac{3}{8}$ of an inch, I should not want them as deep as Mr. Snell says, $\frac{3}{4}$ of an inch. From past experience I should expect them to be built more or less to the separators, unless used in sections more than two inches wide.

C. C. MILLER.

Marango, Ill.

[Dr. Miller is right in explaining that drawn combs $\frac{3}{8}$ deep referred to a particular kind to which attention was drawn. I did not intend to give a general definition. I think Mr. Crane is nearly right in saying that in any case "drawn combs should not be used more than $\frac{3}{8}$ inch deep." To use them deeper would make an inferior grade of comb honey. Before beekeepers learned that unfinished sections could be leveled down *a la* Taylor, and make as good comb honey as that built from foundation, they had come to regard unfinished sections as unfit for use to put back into the super except for bait. Years ago, when the question of unfinished sections in supers was talked over, it was generally concluded that comb honey was of second quality, and that in the end it did not pay. We did not then know that the trouble lay in the full depth of cells. We have since learned that reducing those cells by means of a hot knife or hot plate to somewhere about $\frac{3}{8}$ inch deep, and then putting all such sections back into the super again, not only produces a first-class article of comb honey, but that the supers are filled much more rapidly than in poor seasons.

Mr. Weed found that it was possible to make the drawn foundation full depth if necessary; and to illustrate the possibilities of deep cells, his first set of dies showed cell walls nearly full depth; but later on he came to the conclusion that such depth was entirely unnecessary.

For the purpose of avoiding confusion, the A. I. Root Co. decided to call the new product "drawn foundation," which, indeed, it is. To call it deep cell-wall foundation might cause confusion, because we have for years made foundation on the old foundation-mills that was nearly $\frac{1}{2}$ inch thick; but we never supplied such foundation to our trade, as Americans did not care to pay the price for so much wax. But our customers in Germany have very often sent in specifications for deep-cell-wall mills. For the purpose, then, of avoiding confusion, we called the new product "drawn foundation;" the German foundation, "deep-cell-wall foundation;" and combs drawn out by bees, but leveled down, "drawn comb." As it will be found to be impracticable to use any other than combs leveled down, only this article would be used in the discussion. In the multiplicity of terms we must be careful at the outset to use short ones as well as those that are descriptive.

To sum up, then, the different grades of foundation, we have the "thin" and "extra thin;" the "light brood" and the "medium" (the old "heavy" having been discarded); in Germany, the "deep-cell-wall foundation;" in this country, "drawn foundation;" for comb drawn out by the bees, but afterward leveled down, "drawn comb."—ED.]



INCREASE AND EXTRACTED HONEY.

Question.—Which is the better plan when working an apiary for extracted honey—to make the increase by natural swarming or by division? If by division, when is the best time to do it in latitude about forty-one, white clover being the main plant giving surplus?

Answer.—My favorite mode of increase is by natural swarming; and as a general rule I prefer such increase for the reason that I have found that colonies made by division lose much more time getting ready for work than do the bees when permitted to follow the natural laws of increase. But there are exceptions to all general rules, and this is one of these exceptions. Should we desire, ever so badly, increase by natural swarming, it would be very little we should get if the colonies were worked to the best advantage for extracted honey. A good yield of extracted honey is obtained only by providing the colony with an extra set, or more, of empty combs, putting the same in upper stories at the beginning of the honey-flow, or as soon as the bees have increased sufficiently to receive them without any detriment to their building up the most quickly. Bees do not swarm until the hive is well populated and honey coming in from the fields; hence if we put on combs as above (and we must to secure the best results in extracted honey), these combs go on before any preparation for swarming has been made. Ernest Root never uttered a truer saying than he made when he said that "plenty of empty combs is the best preventive for swarming," and by fixing our bees as we are obliged to to secure the best results, we very nearly if not quite prevent all increase of a natural kind.

In all of my experience with the extractor I have never had a single colony cast a swarm before the honey harvest was beginning to wane; and not ten per cent of the colonies thus worked ever offered to cast a swarm at all. Hence we see, if we wish increase, it must be done in some way other than natural swarming, or we must sacrifice our honey crop quite largely by not putting on the combs till the colonies have swarmed. Hence we have increase by division, where increase is wished, as the only way when working for extracted honey.

Having decided this question, the next thing which confronts us is, "When is that division to be made?" Very many of our most practical apiarists tell us that, where we make increase by division, this should be done a little before the honey harvest, or at its commencement. The *why* of such advice, I have never been able to understand. It is argued that,

after the division, you would have two queens laying instead of one; and in this there is great gain. But such reasoning as this is mysterious to me, for the bees which hatch from those eggs laid by the two queens after the division can never become honey-gatherers in the white-clover-honey harvest, unless said harvest is much more prolonged than it ever is here; so the bees raised from the eggs of the extra queen will only become consumers, without adding one iota to our crop of honey. Yea, more: instead of adding to the crop of honey it will lessen that crop by just the amount that it will take to feed and nurse the brood and the young bees after hatching, which is a clear loss to us.

Then, again, all admit that one *strong* colony will store far more honey when kept together, it not having the swarming fever, than the same colony would if divided and placed in two separate hives, thus making two weak colonies of it. Hence, by dividing at the commencement of the honey harvest, or a little before, we have two weak colonies to do the gathering, up to about the time the harvest closes, instead of the one very strong one; while after-results from fall flowers are no better for an increase at this time. Still again: By such division we shall have many combs from half to three-fourths full of honey to extract from during the season or at the end thereof, instead of little if any more than half the number of chockful combs which will yield bountifully of honey every time we put them in the extractor. Hence we have very much more work in the extracting arising from this division, just before the honey harvest.

For these reasons my plan has been to work the colonies as above given till very near, or just at the close of the harvest, when I go to work and make what increase I wish, by dividing as many of the colonies as I wish increase.

If any happen to swarm near the close of the honey harvest, or at any time during the latter part of the same, I accept their increase as far as they do so, thus lessening the number desired, according to the number which swarm. About ten days before the honey harvest will naturally close, I start queen-cells in upper stories (the colonies thus used for cells should have a queen-excluding honey-board between the stories), according to the plan given in "Scientific Queen-rearing," to the needed number, these queen-cells being built without any detriment to our honey crop, as the old queen is still doing duty below; and when these cells are ripe I proceed to divide the required number of colonies by an equal division of brood, bees, and combs, allowing the old queen to remain on the old stand, and giving the nearly mature cell to the part removed, twenty-four hours after removal, when they will readily accept the same without using any precaution against the

bees tearing the cell open and destroying the young queen.

If queen-excluders are used between the two stories of each colony, as I think it well pays to do, then I like this plan a little better: Four days before I expect to make the division I go to the hive and raise the more nearly mature brood to the upper story; and if I see the queen I leave her below; but I take no special pains to look for her. At the end of the four days I take a look at the combs; and if the queen is in the upper story it will be revealed by there being eggs in the combs. If there are no eggs found I insert a queen-cell and let the hive stand as it is till near sunset, when I take off the upper story and carry it to where I wish it to stand, and the division is made. If eggs are found I hunt out the queen and let her run in at the entrance below, and at night carry the upper story to a new stand, giving the cell 24 hours later, as I did by the first plan, as the bees having a queen in this upper story would be likely to destroy the cell if no precaution is taken. If I do not readily find the queen, where one happens to be in an upper story, I either shake off the bees in front of the entrance to the lower hive, or shake the bees off their combs into the upper hive, smoking the bees down through the queen-excluder, when the queen will be easily found trying to get through the zinc. If I wish to catch the queen I use the latter way; but if I only wish to have her in the lower story, the first is the more quickly accomplished.



PETTIT'S METHOD OF PRODUCING COMB HONEY;
PERFORATED FOLLOWERS.

Will you kindly refer back to page 52 of the present volume of GLEANINGS to that part of the article by Mr. S. T. Pettit, beginning, "But there is another new and valuable feature to be described"? Read to the end, and I think you will conclude, as I have, that Mr. Pettit expresses it well when he speaks of this feature as "new and valuable." I have scanned closely all articles in GLEANINGS and the *Amer. Bee Journal* for a good many years; but, so far as I can remember, this is the first time this simple but practicable idea has been placed before the bee-keeping fraternity. The more I think of this suggestion the more it grows in importance, until I feel impelled to revert your attention to its sterling worth. Not only so, but, original and weighty as this feature appears, I was somewhat disappointed to find that, in your footnote, you failed to give it even a passing notice. But what is this new feature? If I

understand Mr. Pettit aright, it is simply a thin piece of perforated wood, the size of an ordinary separator, placed on the outside row of sections, and a bee-space from the side of the super, held thus by $\frac{1}{4}$ -inch strips. This "divider" admits of two bee-spaces and the clustering of the bees therein, while the $\frac{3}{4}$ -inch holes allow of easy access to either side. With this feature applied, the bees will be able to ascend along the sides of the hive from the bottom-board to the top of the uppermost supers.

This device is easily and inexpensively applicable to the dovetailed super. As now arranged, the follower and wedge occupy a half-inch space unused by the bees. By substituting a piece of perforated zinc for the $\frac{5}{16}$ -in. follower, presto! a bee-space is secured on both sides of the super; $\frac{1}{4}$ -in. strips, $4\frac{1}{2}$ in. long, three to a side, one at each end and one in the middle, stood upright, to be used as wedges. So much confidence do I place in the likelihood of this new contrivance enabling the bees to fill and finish the outside of the outside sections in an ordinary flow that I have decided to give it a thorough test the coming season. The long wedge with which to raise the hive and guide the bees, described in the first part of Mr. Pettit's article, is good; but the perforated followers, securing a double bee-space, warmth, clustering, and free communication, while avoiding brace-combs and bulging, is the latest and best. Like many another invaluable idea, it seems so simple, withal, that we are forced to exclaim, "Why didn't I think of that before?" I believe the progressive beekeeper who adopts this happy hint will be a great gainer thereby; and we all owe Mr. Pettit a debt of gratitude for the generous way he has given this advanced idea to the public.

Wadena, Ia., Mar. 12.

GEO. G. SCOTT.

[I noticed the idea of the perforated follower; but as practically the same sort of device had been used before, I did not refer to it particularly. Perforated separators have been used between sections and next to the outside rows with a bee-space on each side of the separator. I can not now point to the page where such is illustrated in our older literature; but our British cousins have long used the arrangement. The only difference, if any, is that the perforated strips were used *between* the rows of sections, as well as on the outsides. But, even if old, this would not in itself make the idea any the less valuable. It struck me, however, that the slanting bottom board has the more important of the two ideas advanced by friend Pettit, and so I referred to it particularly in the footnote. I am glad you have called particular attention to the other idea, as do doubt it needs more emphasizing than it received on page 52.—ED.]

HEAT FOR BEE CELLARS.

I see in ABC of Bee Culture that you recommend lamps for heating bee-cellars; but as the physiology says that a common lamp uses as much oxygen as 12 people, I should think enough more ventilation would be required to make up for the extra heat of the lamp. I tried

a lamp in my cellar, and had it well shaded, and a good burner on the lamp; but it seemed to disturb the bees, although there was a door between them and the lamp. This I ascertained by listening through the ventilation-hole on top; and I could smell the gas mixed with the bees' breath. Is there any danger of keeping the cellar too tight if the temperature inside does not go above 35 or 38°?

Galt, Mich., Jan. 5. FRED B. CAVANAGH.

[As Dr. Miller has had more experience than we along these lines I asked him to reply.—ED.]

A lamp or oil-stove should not be used to warm a cellar unless there is some way of carrying off the gases that arise from combustion. A can or jug of hot water is entirely safe provided the water is corked in so tight that no vapor escapes. But if you use a common five-gallon tin can, with boiling water corked tight, it will spoil the can; for when the water cools the sides of the can will cave in—that is, in case the can is only partly filled. If filled *full* there will be no trouble. "Stoves in the cellar have probably done more harm than good," as stated in ABC; but there are those who have had much experience in their use, who insist that the harm has always come from the wrong kind of stoves, as oil-stoves without chimneys, or else wrong use of the right kind of stoves.

There is not often much danger of having a cellar too tight, for there are usually enough cracks and chinks for the air to pass through; but there is danger from cold if your cellar continues from 35 to 38°. Better warm it up some way.

C. C. MILLER.

REPORT ON CRIMSON CLOVER IN YORK STATE.

Your report on crimson clover, Mar. 15, reminds me of my own experience with it. I have had it freeze out completely; but last year, the middle or latter part of July I sowed a piece of it with buckwheat, and have to-day as perfect a stand of it as could be desired. The fall was favorable for a good growth, which it made, completely covering the ground, and even in several comparatively wet spots, where it would winter-kill if anywhere, it is growing nicely, and is probably out of danger at this writing, March 22. I think the principal cause of my failure heretofore has been to sow too late, not getting a perfect mat of leaves before winter set in.

C. WECKESSER.

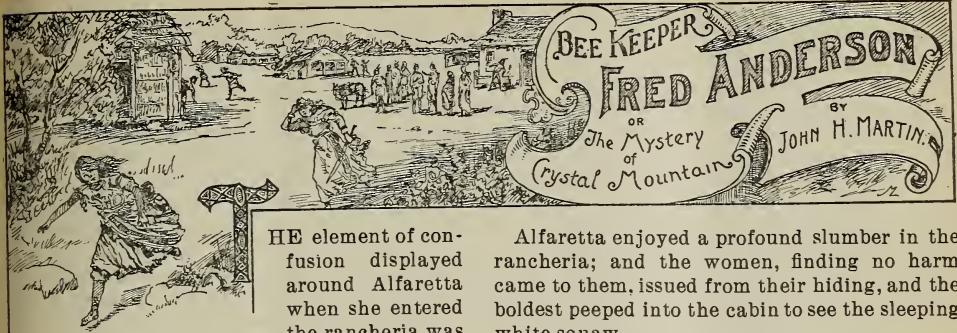
Sanborn, N. Y.

DRAWN COMBS AHEAD.

In regard to using drawn combs in boxes I have the best of luck with them. I generally put one-half drawn combs and the other half foundation, and I always find the drawn combs filled first; and I have often wished that full combs could be made for surplus and brood-chamber. I think I should rather pay more for the same.

G. S. BROWN.

Salisbury, Vt., Feb. 19.



THE element of confusion displayed around Alfaretta when she entered the rancheria was just suited to her

mental condition. The people were so different from those she met in her home life, and appeared so frightened, that she hastily dismounted from her pony and gave chase to the nearest squaw; and it is needless to say that the "confusion was worse confounded." There was a stampede of nearly the whole population. In their minds the ancient tradition was about to be verified. The white squaw had arrived, and to snakes they were to be changed. The older men, however, collected in a group and awaited with much show of dignity whatever ordeal might be practiced upon them.

Failing to catch the squaws, Alfaretta approached the group, flitting her riding-whip toward them, shouting, "Shoo, bad men, shoo!"

"We no bad men," said the chief. "We much good Indian. We no kill, no scalp white man; much good, much good Indian."

"You good Indian?" said Alfaretta; "then tell me where is Fred Anderson?"

"Fred Anderson?" said the chief, shaking his head; "him hard case to find. Him way up mountain; you see him some time. Go rest in wickiup, white squaw; we much good Indians."

The idea of rest was a proper one for Alfaretta to entertain. The violent ride and excitement had left her very weary, and a cabin and a cot were gladly accepted, and she was soon fast asleep.

Since Dr. Hayden had been confined so closely to the valley he had instituted a novel mode of communication with the Indians. Upon a prominent point upon the rim of the valley, and on the side nearest the rancheria, he had placed a vigorous colony of bees. This colony sought nectar from the flora outside the valley, and the doctor instructed the young Indians to observe closely their movements; and if he was urgently needed outside the valley they were to dust flour on several bees; or if there was danger threatened, they were to use a red pigment. By a combination of colors the doctor worked out a good signal-code; and upon the afternoon, soon after Alfaretta's arrival, the colors read, "Meet parties at the entrance; danger."

Alfaretta enjoyed a profound slumber in the rancheria; and the women, finding no harm came to them, issued from their hiding, and the boldest peeped into the cabin to see the sleeping white squaw.

The purport of her mission was discussed by the older Indians, and two of the older squaws were delegated to escort her to the valley, while, aside from the telegram over the bee-line, two Indians were sent to the valley in the early evening to consult with the doctor. Before the squaws left the rancheria that night the Indians had seen enough of Alfaretta to know her mental condition, and their fear of a few hours previous changed to pity. Their conversation denoted solicitude for her welfare, and that Neo-a-ho-a, their great medicine man, should exorcise the evil spirit that possessed her.

Alfaretta upon her pony, and the two squaws trudging beside her, entered the mountains through a blind canyon a little past midnight. Dr. Hayden, with the two Indians, was awaiting them in an obscure retreat near the great balanced rock that guarded the entrance to the valley.

Gimp Dawson had encountered various episodes in his day's journey, and, but for the contrariety of old Jake, he would have overtaken Alfaretta at Covelo. Here Prof. Buell and Joe Splinter found him; and the snarl of questions with which Gimp was trying to tangle the saloon loafers was soon made plain by Prof. Buell, with the result that the man Jim, locally known as Slim Jim, and Pete Armstrong, who made it his business to hunt, with loaded rifle, for the mysterious man of Crystal Mountain, made two more willing additions to the search party, and young Armstrong, after an unsuccessful search at the Indian rancheria, led the party directly to the old cabin in the obscure canyon. Here they camped, and posted their watchers at various points. Gimp, the youngest and the most inexperienced, was posted in a little obscure passage opening nearly behind the big balanced rock, and ending, apparently, among the boulders beyond. "There, youngster," said Slim Jim, "ye can take a nap, for nobody'll disturb ye in there."

All was quiet about the mountain; for in these solitudes, as night deepens, not a chirrup of a bird, the piping of an insect, nor even the rustle of a leaf, is heard.

Gimp sat in the dark, listening to his own heart-beats so long that he became drowsy, and finally fell asleep. Alfaretta was escorted to the valley's entrance through this very intricate and obscure passage. Silently each one of the escort glided along. Dr. Hayden had met them at a point some distance out, and guided their movements. When he found Gimp asleep he stood beside him, motioning the rest to pass. All had entered the dark passage under the rock, and Dr. Hayden was about to leave Gimp when the latter sprang to his feet and was about to shout. The doctor's strong hand was placed over his mouth, and he too was hurried into the passage. But Gimp was strong and active, and, getting advantage of the doctor, he shouted at the top of his voice, "Help! help!" His mouth was this time bandaged, and the great rock fell to its place with a crash, and Gimp was lost to his companions.

They heard the shout, and the crash of the rock; but the keenest search failed to reveal the least trace of poor Gimp.

In the morning Alfaretta's saddle was found half a mile down the valley; but neither Jack nor the rider was to be found.

Prof. Buell's feelings can better be imagined than described, and he was not consoled by the tales of Slim Jim and young Armstrong, for they painted the mysterious man of Crystal Mountain in hideous colors.

For several days the mountain passes were searched as they had never been before. Prof. Buell even essayed to cross that terrible obsidian barrier, but with only one result—deep gashes in his feet and legs. He finally gave up the search, and returned to his home, with a sad heart, but with the hope that is always in the heart of a Christian—that all will be well.

In the morning, when Fred Anderson heard the well-known song, and realized that Alfaretta was in the valley, he quickly sprang down the terrace and was at her side.

"Alfaretta!" said he with deep emotion.

"Ah! this is Fred Anderson," said she; "my mermaids told me where to find you—away, away up the sunny mountain. We will part nevermore—nevermore."

"Oh that she were sane, how gladly would I listen to such a prophecy!" said Fred half aloud. "But, Alfaretta"—but Fred was interrupted by the approach of one of the squaws, who said, "Neo-a-ho-a am in cabin. Him feel bad. He no like white squaw. You best see Neo-a-ho-a;" and she turned an obsequious attention to Alfaretta, who led the way up the terrace, singing her song and collecting the beautiful flowers that hung in profusion on every hand.

Fred hastened to the doctor's cabin. The latter sat in deep abstraction. He noted, not Fred's entrance. Tears were flowing from his eyes.

"Doctor," said Fred, gently; but there was no movement. Fred realized that something of unusual interest was upon the mind of his friend, and he stepped softly out of the cabin again and strolled down to the little stream that ran through the valley. Upon nearing a clump of oaks he heard Sam talking in a consoling way to some one. "Now, honey, you shouldn't cry. You's in de mos beautiful valley in de whole world. See de red posies, de blue posies; see de rocks, de trees, de sparklin' Wis-ton-we; and jus' see me, de brack posy."

"Darn ye and yer posies, yer dirty Injuns an' yer squaws. Le'me go, will yer?" and there was a struggle.

"Why, Gimp Dawson," said Fred, as he hastened through the bushes. "Gimp, you here? Sam, what have you tied that rope around him for?"

"You see, Mister Fred, this young kid wants ter own dis hyar whole valley. He's had more'n forty tantrums this mornin'. I spects he's got to be reconciled."



"LE'ME GO, WILL YER?"

"Well, Sam, take off the rope. Here, Gimp, you know I am your friend. Alfaretta and you and I are all in this valley now, and we must make the best of it until we can get out. Sam is a good fellow, and will treat you well."

"Don't want nuffin' to do with the nigger," said Gimp.

"Don't hurt yer feelin's a callin' me names, honey. Tain't de color ob de skin dat makes de man; it's de actions. But, Mister Fred," said Sam, suddenly, "I wish ye'd go up to de cabin an' rouse de doctor; he eats no breakfas', an' sits a gloamin' an' gloamin'. Dis hyar white gal has a strange effec' upon him. Jes as he was a joicin' about a bachelor's paradise dis gal pops in to spoil it."

After giving Gimp some further advice, and telling him to see that no harm came to Alfaretta, he again went to the doctor's cabin.

"Doctor," said he, bruskiy, as he entered, "I see that you have visitors this morning."

"Yes, yes," said the doctor, slowly; "we have visitors, a visitor, and, Fred, do you know the lady in white?"

"Yes, doctor, she is the lady we have talked about so much. Her name is Alfaretta Buell."

"Fred Anderson, you are mistaken. You have been deceived;" and as the doctor arose and paced the floor he said, in terrible earnestness, "Fred Anderson, that young lady's name is Alfaretta Hayden—my long-lost daughter."

"No, doctor," said Fred, with equal earnestness, "you can not mean it. Your daughter, doctor—ha, ha! are we all going crazy? are we dreaming?"

The doctor stepped across the cabin to a little cabinet, and took from an inner recess an old-time ivorytype; "look upon this picture, Fred."

"Alfaretta, for sure," said Fred.

"Alfaretta's mother," replied the doctor. "Now, Fred, sit down. I must talk. Let me tell you the story of my life. I believe I have told you that I was born in Western New York. The farm adjoining ours was owned by my



"LOOK UPON THIS PICTURE, FRED."

uncle, Wm. Bull. His son Clarence was about my age, and we were always fast friends, and were always together until we graduated from college. Our ways parted then for a time. I went to Germany to finish my education in medicine, and he to the far West as a surveyor. The civil war brought us together again—I a surgeon and he in an engineer corps. We escaped the dangers of war, and returned to our paternal homes. We longed for the quietness of home life, and, soon after our return, we both found suitable companions, and settled down to a happy domestic life—Clarence a teacher, and I in the practice of a country physician. Perhaps our lives were too full of joy. Our homes were the scenes of happy gatherings, and the sunshine of love filled our cozy homes; but in the midst of this happiness

the storm lowered, and in the birth of Alfaretta the life of the one I loved went out. Ah, dear Fred! little do you know of the sorrow in losing one so near and dear as a wife. No more the face greets you at the window; the smile that gave the heart a stronger throb of joy is now only a memory; where there was cheery presence, laughter, song, all is still. In the deep silence of night, in some lonely trysting-place, I uplift my clasped hands and cry, 'O lovely spirit! dear one, come and whisper words of love and hope to me; clasp my hand; let me but feel thy presence.' The summer breeze stirs the foliage above me, but there comes no answering word—lonely, so lonely; and when I retrace my steps to that desolate home, an unrest seizes me and I would haste away to the far corners of the earth. The young life that had come into my home under such sad circumstances was taken into the home of my bosom friend, Clarence Bull. Their little Adrietta, after a few months of life, had died, and Alfaretta found a warm welcome there. It is needless for me to tell you that, from the hour of the death of my wife, I became a wanderer, I first went to Mexico, then to Peru. I became a prominent factor in one of their periodic revolutions, and upon the defeat of our party I was sent far into the interior, and for several years had no communication with my distant kindred. When I did return to my old home, things had greatly changed. My cousin Clarence had moved to Denver; thither I went in search of him; but he had left his position there under a cloud—some scandal connected with his school, and no trace of him could be found until I met you. But the changed name misled me. His wife's pride, or perhaps the scandal, led to the change.

"I have had some bitter feelings against him this morning, but I am sure my old-time friend is far too generous to ever deceive me. I shall trust him. But, O my daughter Alfaretta! would that I had not found thee."

The doctor's reflections were suddenly interrupted by a great noise from the terrace above, like the crushing of glass, followed by shrill shouts by the squaws, the agonized braying of a donkey, and Gimp shouting, "She's killed! she's killed! oh she's killed!"

ANOTHER DEFUNCT JOURNAL.

Noticing in your January 15th number an article by Dr. C. C. Miller, giving a list of defunct bee-journals, as the subject seems to be of interest to your readers I write to call attention to *The American Bee Gazette*, which started some time in the '60's in New York City, under the management of E. Van Slyck, and, after a few issues, was absorbed by the *American Bee Journal*, of Washington, D. C.

Bellaire, Mich.

ROSWELL LEAVITT.



BEES appear to have wintered unusually well all over the country, up to this writing; and so far the spring has been favorable.

THE California anti-honey-adulteration law, spoken of in last issue, is already bearing fruit, for, according to the *Pacific Bee Journal*, "The fight is already on, . . . and many arrests have been made." This sounds like business. Let other States follow suit.

THE use of drawn combs in sections, and their value in supers, is being commented on very favorably in the *Review* and in the *American Bee Journal*. By "drawn combs" is meant those that are built wholly by the bees, but have been previously drawn out to catch the honey-flow."

THE new machine for making drawn foundation is now able to turn out samples with cells about $\frac{3}{16}$ deep, running somewhere about 9 feet to the pound. The base is very much thinner than in that of any sample of foundation that we have hitherto turned out, and the walls themselves are about $\frac{1}{1000}$ thick— $\frac{1}{1000}$ being the natural thickness. We are at present using only a small portion of the die surface. Later on we hope to make larger samples the same weight.

IN the last *Review*, experimenter Taylor, of the Michigan Experiment Apiary, details his experiments with the Aspinwall non-swarming hive. He has used two of these hives in his apiary for two seasons, and yet he says "the results, so far as determining the true value of its non-swarming quality is concerned, are thus far negative." Elsewhere he states that "swarms from other hives were exceedingly few. The hive is a marvel of ingenuity," he says, "with closed-end frames held compactly together with a screw which works against a movable side." An objection to the hive, he urges, is that it would cost considerably in excess of the regular Langstroth hive; and the present times and low prices and small profit speak too eloquently in the ears of the producer.

Personally I have always liked the appearance of this hive, and it has seemed to me that it contained good features providing it did not make the hive too expensive.

MRS. J. N. HEATER.

IT is with much regret that we announce the sudden death of Mrs. J. N. Heater, of Columbus, Neb.—one of the leading lady bee-keepers of her State, and at the time of her death she

had attained almost national distinction. She was present at the Lincoln convention, and gave us a valuable paper. Mrs. Heater had undergone an operation, which was supposed to have been successful; but it seems the anesthetic—chloroform—was too powerful for her. She was an earnest Christian woman, and at the time of her death we have no doubt she had placed her hope in Christ Jesus. The manner of her death is told in one of the local papers in this way:

On Friday night, March 12, Mrs. Heater could not sleep; and toward morning Mr. Heater, who was at her bedside, said, "Shall I sing to you? Perhaps it will put you to sleep." The suffering one nodded assent, and Mr. Heater softly sang a favorite song, and she seemed to drop into a gentle sleep; but, alas! the watching husband soon found to his sorrow that it was the sleep of death.

The untimely death of Mrs. Heater reminds us of the very sudden death of another lady almost equally prominent, who was present at the Lincoln convention—Mrs. A. L. Hallenbeck. It will be remembered that she died from the result of injuries received in a runaway, about ten days after the convention.

THE MAJESTY OF THE LAW.

JUST as we go to press, the April number of a bee-paper (monthly) is at hand. It is filled almost from cover to cover with articles attacking the new drawn foundation. Some of the writers have not only resorted to gross misrepresentations and ridicule, but have gone so far, in our judgment, as to libel our name and attempt to injure our business. Indirectly, but *very pointedly*, we are referred to as "unprincipled men," "adulterators," and the like. The editor is evidently making the effort of his life to injure our name, reputation, and business. He has written bee-keepers everywhere to secure sympathy. From some of them, as we know, he has received cold comfort in return; and the letters from others he has, of course, published. We have fully explained our course; and any reasonable person knows we do not and would not do any thing to injure the honey business.

One thing is certain—we shall not weary our readers with an extended reply in defense of our name. As to what we shall do further, we have not yet decided. It may not have occurred to some of these writers that they may be rendering themselves as well as the publisher amenable to the law.

CHARACTER OF COMBS CONTAINING HONEY; A DISTINCTION IN TERMS.

IN the April 1st issue of the *American Bee Journal* is an article from W. Z. Hutchinson, the last paragraph of which is as follows:

I recently expressed my views regarding the new deep-cell foundation, with which The A. I. Root Co. is experimenting, and have only to add, when such a man as E. R. Root says that the comb resulting from the use of this new foundation is as brittle and "eatable" as natural combs we can only wait—

suspend our judgment until we can try it ourselves. If it should turn out that the use of this product does not debase the comb honey, and it can be produced in commercial quantities at a low price, it is quite likely that it will solve the question of *how* drawn combs should be produced. In the meanwhile we can go on getting drawn combs according to the plans that we know are successful.

Mr. Hutchinson quotes me as saying that the comb resulting from the new foundation is "brittle" and eatable. By the term "brittle" he means the same thing that I do; but it seems to me that brittle is not the correct word. If I am any judge, comb is never brittle when filled with honey. It is only when empty and dried out that it becomes such. I think what Mr. Hutchinson means by "brittle" is flaky; and yet to my mind this gives a wrong notion. Comb containing honey should be soft and yielding, whether natural comb or that made from ordinary foundation or from drawn foundation.

Mr. Hutchinson's position is very fair. We are quite willing to place this whole question before the bar of the future; and if that future shall decide against the new product, even though we have invested a heap of money in it we shall drop it. But the past has most emphatically given its decision in favor of the new drawn foundation.

THE NEW UNION AND THE RESULT OF THE ELECTION.

The following report has been received, and will explain itself:

To the Members of the United States Bee-keepers' Union:—We, the Executive Committee, according to the power vested in us by the new Constitution, hereby appoint the following as General Manager and Board of Directors of the United States Bee-keepers' Union, to hold their offices during the remainder of the year 1897, or until their successors are elected and qualified:

GENERAL MANAGER—Hon. Eugene Secor, Forest City, Iowa.
BOARD OF DIRECTORS—Ernest R. Root, Medina, Ohio; Rev. E. T. Abbott, St. Joseph, Mo.; Dr. C. C. Miller, Marengo, Ill.; W. Z. Hutchinson, Flint, Mich.; E. Whitcomb, Fremont, Neb.; C. P. Dadant, Hamilton, Ill.

GEORGE W. YORK, Pres.,
E. WHITCOMB, Vice-Pres.,
A. B. MASON, Sec.,
Executive Committee.

Chicago, Ill., April 1, 1897.

[Mr. York, of the *Bee Journal*, comments as follows:]

Now as the United States Bee-keepers' Union is fully equipped as to its officers, we trust that bee-keepers everywhere will at once send in their dollar membership-fees to the General Manager, Hon. Eugene Secor, Forest City, Iowa, or to the Secretary, Dr. A. B. Mason, Sta. B, Toledo, Ohio, so that there may be ample funds to begin to carry out the objects of the Union, which are expressed in the following paragraph taken from the new Constitution:

ARTICLE II.—OBJECTS.

Its objects shall be to promote and protect the interests of its members; to defend them in their lawful rights; to enforce laws against the adulteration of honey; to prosecute dishonest honey-commission men; and to advance the pursuit of bee culture in general.

What more do you want? Where is the bee-keeper that doesn't want to help carry out every one of those splendid "objects"? Surely, every bee-keeper in the land will be glad to have his name enrolled as a member of the new Union.

I say amen to every thing that Mr. York has said. Article 2 shows the object of the new organization. Its field is large—very large. Perhaps this season it will not be able to make a very great showing until we can get it on its feet. First of all, we need funds, and that

means a large membership. Those who are anxious to see some of the crooked ways of commission men brought to light, and the glucose evil fought, should plank down their dollars at once. Unless the officers are supported, they can not very well compass much in the lines indicated.

THE WILLIAMSON PRODUCE CO.; SANFORD & CO.; COMPLAINTS.

MR. J. H. HOYT, of Otisco, N. Y., shipped to the Williamson Produce Co., commission merchants, of New York, 2000 pounds—his entire crop—of honey last September. He has their note, but it would appear he will not be able to realize upon it. The Williamson Produce Co. gave as references on their card the name of R. J. Dean & Co., bankers, New York. We wrote to that firm, inquiring about the responsibility of said Williamson Produce Co., and received the following reply:

The A. I. Root Co.:—In reply to your letter of March 19, we would say that we never gave the Williamson Produce Co. permission to refer to us. From the complaints that have been coming here, we should say that they are anything but responsible.

Yours respectfully,

R. J. DEAN & CO.

302 Greenwich St., New York, March 22.

On the 19th of March we wrote to the Williamson people, calling their attention to the complaint of Mr. Hoyt; but as yet we have received no reply. It is possible that they will take up the note; but in the mean time our readers can draw their own conclusions.

In the last *American Bee Journal* there is recorded a complaint regarding the now extinct firm of Sanford & Co., of New York. Complaints have also come to us concerning the same parties. A word to the wise is sufficient.

When will bee-keepers learn not to trust the product of their honest toil to entire strangers? In the first instance, it is possible that Mr. Hoyt was misled by the fact that the Williamson Produce Co. referred to a responsible banking house which he knew. If he had taken pains to write to this house before he shipped his honey he might now have something to show for his year's work with the bees.

A few days ago we received what we *thought* was quite a bad complaint against one of the firms that furnish quotations for GLEANINGS. On referring it to the firm in question we learned that the bee-keeper had sent the honey without orders, as well as some other produce; and the firm wrote us that, if their patron had simply asked for instructions, they would have advised him to hold his produce until they could have found for him a customer in his own vicinity. But, no; our friend, without orders, shipped the produce to the city, at a distance from his own home, where the goods (apples in this case) were a drug on the market, and were actually being dumped by the hundred bushels because there was no sale.

Moral.—Do not trust unknown firms, even if they do furnish good references. Write to the references first; and while you are about it write to us too, for we are on the track of nearly all the honey firms. Second, do not ship your honey or any thing else without first receiving orders from the commission house.

FOUNDATION WITHOUT SIDE WALLS.

ALLUSION was made in our last issue to the fact that a number of bee-keepers had clubbed together to purchase a foundation-mill that would turn out an article without side walls. Mr. Bingham, in a recent article in the *Review*, in writing of this, says: "While not strictly an invention, it is practically such."

I do not know whether he meant to say that such foundation was new or not; but, if I am correct, the first foundation that was ever made had no side walls. Cheshire, in his "Bees and Bee-keeping," second volume (1887), has a good deal to say about what he calls "artificial midrib;" and in Fig. 48 he shows a wax-press for making the product. One of the earliest patents on foundation, I believe, showed the foundation without the walls. Something like twelve or fifteen years ago we made a mill for W. W. Bliss, then of Duarte, Cal., that turned out a foundation without side walls, running about fifteen feet to the pound—in fact, an almost exact duplicate of that which is turned out on the mill made for the members of the Michigan State Bee-keepers' Convention, the product from which has been so greatly admired by Mr. Bingham and others. The first foundation that was ever made by A. I. Root was from small plates that were an exact counterpart of the midrib without wall. One of these old die-plates was used in the office, as a memento of old days gone by, but serving in the exalted position of a paper-weight. Singularly enough, up till recently it was wont to hold down the piles of orders for the new Weed process foundation.

Artificial midrib, if we adopt the word of Mr. Cheshire, is not a new article; but the mere fact that it has been tried in the past, and seemed to have been forgotten for some reason or other for the regular foundation, is somewhat significant. But many another good thing has been abandoned, which later on has proved to be of value. Possibly this may be true of the article over which a few of the members of the Michigan State Convention were so enthusiastic.

But if it is a light foundation that is wanted, we can make, and, in fact, have made, an extra thin, having side wall, running 15 feet to the pound; and I am not sure but we could make it as light as 18; but the very light grades do not seem to meet with a very favorable reception by the bees nor by their owners.

Mr. Bingham seems to feel that the septum, or midrib, without side walls, would be less liable to sag than that with. To me it would seem as if it were the other way. The grounds for Mr. Bingham's convictions are that a side wall is unnatural, and that, in the effort of the bees to improve it, they fall into all sorts of calamities. These are points that this season's experimenting will very easily settle.

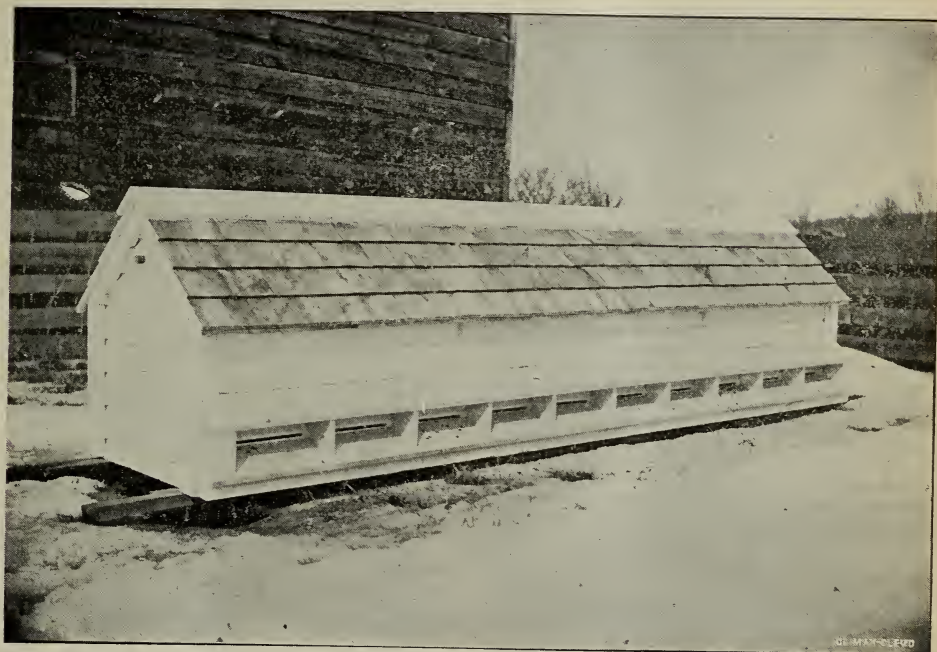
THE ORTON TEN-COLONY TENEMENT HIVE.

SOME little time ago we received two fine photos of a tenement double-walled hive, and along with them came a short description. This last seems to have been mislaid during the interim in which the engravings were being made. I have been waiting for it to "turn up," but as the subject-matter will soon be out of season I decided to submit it to our readers, without a description, and let the pictures do their own talking.

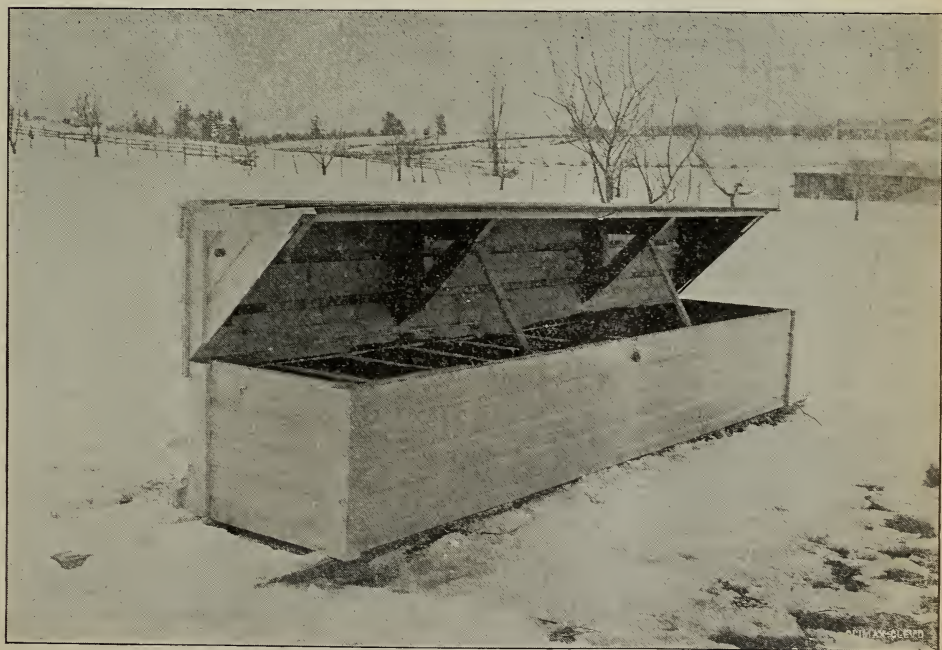
As will be noticed, it is a double-walled hive made to take ten colonies. The cover easily tilts back on hinges, to permit of the manipulation of the colonies, though I imagine it would be a little cramped in working under the cover. The whole material for making up the hive, including the drop siding, if I remember correctly, was less than \$5.00; and from the pictures almost any one could construct one like it. Of course, he would have to figure out his own dimensions.

One objection to the ordinary tenement hives is that they are unwieldy. As usually constructed they are made to take four colonies. When sufficient space is allowed for packing, it makes the space so large that it will not go into an ordinary wagon. By taking off the wagon-box, and extending the reach, this hive of Mr. Orton's could be skidded up on to the wagon; but as a general rule, after it is once set down it should stay in that location. Such a hive would be convenient at out-apiaries; and if located in sight of a house, and the cover secured down by means of a padlock, it ought to be reasonably free from the depredations of thieves and heavy winds.

It will be noticed that the upper stories of each brood-section are packed with sawdust or other loose material. By looking very closely you will notice on the back side of the open hive that there is a space for packing-material around the ends of the hives. If there is only thin wood between each brood-nest the two contiguous colonies would be apt to cluster up next to this on account of the warmth. When we kept our tenement hives running, the winter clusters in the four hives were huddled together as closely as possible, and I have no doubt that Mr. Orton finds his colonies have a tendency to cluster in pairs—one on each side of the thin board separating the two colonies.



ORTON'S TENEMENT HIVE, CLOSED—FRONT VIEW.



ORTON'S TENEMENT HIVE, OPEN—REAR VIEW.

OUR HOMES.

And Joseph gathered corn as the sand of the sea, very much, until he left numbering; for it was without number. . . . And all countries came into Egypt to Joseph for to buy corn; because that the famine was so sore in all lands.—GEN. 41:49, 57.

A few days ago a paper was sent me from Nebraska, with a marked article for me to read. After reading this article my eyes wandered into the next column where there were market reports of the different grains. It read something like this: "Corn in the ear, 10 cts. per bushel." As I read this I concluded it must be for just a bushel basketful of ears of corn; but the next quotation dispelled this delusion, for it read, "Shelled corn, 10 cts. per bushel."

When we were at Lincoln, Nebraska, some of the friends explained that you could buy the shelled corn at about the same price as corn in the ear, because the cobs are worth the cost of shelling, for fuel; and they explained that, where corn is quoted at so much in the ear, out west, it means enough ears of corn to make a bushel shelled. A whole bushel of shelled corn for only 10 cents! Six pounds of one of the most nutritious and sustaining foods that the world ever saw, for just one cent! No wonder our farming friends felt blue and discouraged. And then I wondered why they did not stop raising corn until the price went up a little; but I went on reading the market reports, and I found oats per bushel, 12 cts.; rye, per bushel—I do not now remember exactly whether it was 30, 35, or 40 cts., but it certainly was a ridiculously low figure. How can farmers go on and prepare their ground and put in their crops with old corn standing around wanting a purchaser, at only 10 cts. a bushel? Why, it seems to me they can not do it. Things are coming to a standstill. Farmers can not buy books and papers, nor even hives and garden seeds. They can not go to the store and trade. They can not even afford postage-stamps, let alone nickels, unless something is done for their relief.

Now, please do not worry, friends, and fear that A. I. Root is losing his faith in God and God's plans. If I were losing faith I would not be writing these Home Papers; for it was faith in God and faith in my fellow-men that first started me; and God will give me faith—and at least a degree of wisdom, I am sure, to discuss some of these social problems. Something must be done, and done right speedily, to take this corn that is at present, as in the language of our text, "as the sand of the sea." I do not know but the friends out west have left off numbering, as Joseph did, because the quantity is so great, and nobody to purchase it. In the latter verse of our text, please notice that "all the countries came into Egypt for to buy corn, because the famine was so sore." Is it a famine that is needed? Well, we certainly need not pray that God may send a famine, for already there are millions starving, and millions that will die unless this corn is carried to them. In the last issue of the *Chicago Advance* we are informed that a company has been formed, and a great steamship line has volunteered to move the corn from our Western States right to the sufferers in India, free of charge. One of the great problems in the matter—in fact, I might say the great problem—has thus already been solved—the cost of moving the corn to the sufferers. May God be praised for this much. In the article I have alluded to in the *Advance*, so far as I can gather, the impression was left that the farmers out west should contribute the corn free of charge. They can get only 10 cts. a bushel for it any way, and they might as well

give it away to get rid of it. That seemed to be the impression left, but perhaps I am mistaken. At any rate, I wish to make a little protest right here against asking the average farmer to give *any* thing. If he sells the corn at 10 cts. a bushel, or something like that price, he has done enough. Let the rest of the world—the moneyed world—pay him this small price for his corn. It need not be an act of charity; for if the West can not be set to work raising more crops, we are going to suffer, each and all of us. The manufacturers of the world, and, in fact, the merchants of the world, depend, either directly or indirectly, upon the farming people for customers. We shall surely come to grief, all of us, if we do not remember with kindly feelings the people who till the soil and raise the crops. I do not believe that business men, as a rule, are at the present time inclined to look down upon the farmer. There may be a certain class of dudes and a certain line of aristocracy who have a foolish sort of pride in thinking they do not have to work down in the dirt, as the farmer does. These people are not worth noticing, and some of them, at least, end their days in poorhouses and asylums. I have seen this sort of retribution. As a rule our people have respect for the tillers of the soil. Our great cities are obliged to bring in boys and girls from the country, to do their work with both brain and muscle.

The farmer does not ask for charity from the merchants and manufacturers. He would not take it, for he has at least a wholesome degree of pride; but he does ask that, from motives of self-protection and common interest, he be remembered. It is certainly to our interest to turn in and help him dispose of his crops. The United States of America can, if it wakes up, raise enough money in 24 hours to relieve our farmers of their surplus grain, and set them going on their ways rejoicing, and at the same time feed the starving brothers and sisters across the water, and set them also to rejoicing. Just look into the matter, and read the letters from the hard-working missionaries in our foreign fields. And this work need not be altogether "cross-bearing" either. The man who contributes till he feels it, feels happier, and is prospered in every way a hundred times more than the miser who gets all he can and keeps all he gets.

Why, dear friends, we can not even enjoy a good dinner without making some sort of sacrifice for it. My good friend and dear brother the Rev. A. T. Reed, who is riding that "evangelistic wheel," took dinner with us yesterday. He had been having one of his first wheel-rides for the season; and while enjoying his dinner he told me that no one could believe, until he had tried wheel-riding, what a keen zest and enjoyment it gives one for his food. It gives such an appetite that even the plainest food becomes delicious. Some of you know about this. Surely there is no excellence without great labor; and this may apply to a dinner as well as to literature and mechanical work. The man of wealth can not enjoy the good things of this world and life in general unless both he and his capital are doing *work* of some kind. Why, dear friends, you all know that money does not make a man happy. There have been several reports of millionaires who committed suicide; and only yesterday I read of a man who put an end to his life, who was worth something like four millions. Had that man gone west and bought corn, to be shipped to the starving people in India, he would have been so happy that no thought of throwing away his life would have entered his head. If he had learned to ride a wheel, and had then

gone around among the farmers on the wheel, giving them checks for the contents of their corn-cribs, I think he would have enjoyed a good dinner of corn-meal mush and maple molasses as he had never *dreamed* of enjoying a dinner before.*

Now, friends, there are probably not many millionaires who read GLEANINGS. There may be a few—I do not know. If there are, may God's Holy Spirit bless this little message, and make it bear fruit; and even if you are not a millionaire, may you catch the inspiration from the Holy Spirit, and cast your mite into the fund to move these great masses of corn, that is like the sand of the seashore, to where it will do good. Won't it make you happier to put off buying something you had planned to buy, and give at least a part of your possessions to the Lord? You see, there are three birds to be killed with one stone: First, the saving of precious human life; second, relieving the farmers, and setting them at work rejoicing; third (I put it last because it comes the nearest to self), open the way for prosperity in your own business by helping your brothers both east and west. Why, bless you, it will not be *lost*. In this short life of mine I have many times thrown money away, as some people would look at it—yes, as some of my friends have said—but it was really, however, casting my bread upon the waters; and in many days this bread so cast forth for Christ Jesus' sake has come back with renewed and *wonderful* interest. You can not think how cheering and encouraging it has been while off on my travels to find that I had, away back, helped to benefit somebody, and had forgotten all about it. I need not tell you of these things, because it would seem like boasting; but the very fact that our business has been prospered is owing very much indeed to occasions where I had forgotten business, as it were, and contributed sometimes pretty heavily to demands from foreign fields. Ever since I became a Christian I have given heavily to the cause of missions—many times when I was paying interest on borrowed money to do it; and again and again has business come along in some unexpected and unheard-of way because I had years before listened to the call and promptings of God's Holy Spirit rather than to heed the promptings of selfishness.

Perhaps there are many among the readers of GLEANINGS who really can not give very much consistently. If so, then let them give a little trifle and back it up with earnest prayers that God may move the hearts of men during this beautiful springtime.

It is not only in suffering India just now, but within the past few days the floods in the South have been so severe that great quantities of corn and other things will be needed there as well, in all probability. Even as I write, an organization has been formed, and the President of the United States has been asked to give governmental aid. Now, let us spring forward as we did during the Chicago fire, and later during the Johnstown disaster, and let these suffering friends know that at least we, who profess to be a Christian nation, do love our neighbors. Even if we do not quite come up to the scripture injunction to love them as *well* as ourselves, let us show that we have regard for those who have lost their homes and their farms through no fault of their own, but rather through a wonderful dispensation of Providence which we can not just now under-

stand. I do believe good is coming out of it all, and I rejoice that as yet there has been so little loss of life. Let me digress again just a little:

House-breaking and highway robbery have been worse during the past year or two than perhaps ever before in the United States. This matter of "holding up" and taking a man's money is now getting to be alarming. It is said that even the boys are practicing it. There seems to be a sort of wave, or, as some would call it, a "fad" to take a man's money away from him by force. God forbid that this craze or fad should go any further. Is it not possible that, in God's providence, it may be counteracted by another and a *greater* wave in the line of the little text which says, "Do good, and lend, hoping for nothing again"? and may not this wave be so great as to throw accounts of prize-fighting into the background? May it not sweep away and blot out the cigarette business? May wholesome activities in the way of benevolences toward our fellow-men crowd out selfishness and brutality! May the Lord bless and help in this work that comes just now before our beloved United States of America!

It seems a little funny, but just now the very best recommend that the Anti-saloon League of Ohio has ever heard from any source comes straight from our enemies. May the Lord be praised for such testimony as they have seen fit to give *publicly and in print*.

The following is an extract from the *Wine and Spirit News*, official organ of the Ohio State League, of Feb. 24, 1897:

□ You are scarcely aware of the activity of the Anti-saloon League. It is but little over three years old, and yet in that brief time it has accomplished more than any organization ever formed in a similar time. The first year it held 2000 meetings. The second year it held 6000 meetings, and the third year 12,000 meetings were held in the State of Ohio. In all, the officers and members of this league have slandered your business and my business in the presence of 300,000 people in the three years, or at the rate of 100,000 every year. The highest number of saloons in this State at one time was over 13,000; now the total number has been reduced to less than 9000. The Anti-saloon League has reduced the number within the last year and a half 1500. In the same length of time they championed a bill in the legislature that would make sixty counties of this State vote "dry" at the very next election, which would have been this spring; and, what is more amazing still, they actually secured fifty votes in favor of its passage. Two years have almost gone by, and we are face to face with the same issue again. The same enemy is again in the field, better equipped, with more men and more supplies than he was when the Haskell bill was defeated in the last General Assembly by the narrow margin of seven votes. Our duty, therefore, as business men, engaged in the liquor-traffic in this State, ought to be plain. We must fight fire with fire.



□ On page 26, Jan. 1, I told you I was getting in training for an expedition of 280 miles overland to the Grand Canyon. A little more than half this distance had been made. When we were at Robert Phinney's, up in the mountains, we were about 30 miles from Flagstaff; and Flagstaff is about 75 miles from the Grand Canyon. Our trip of 150 miles or more overland had been gradually ascending. The city of Phoenix is but a little above the level of the sea, with its

* May I digress just a minute to say that the corn-meal mush should be boiled at least four hours as we do the wheat and rye?

mild temperature. At Campe Verde we are told it is almost a mile above the sea-level. There was considerable frost every night, and the mountains were more or less covered with snow. Before reaching the Grand Canyon I must go almost a mile more, nearly straight up. I was told everywhere that it was a dangerous trip to take in winter; and the cool nights and the raw northeast winds had begun somewhat to affect my health. Very reluctantly I gave up the undertaking until at a warmer season of the year. You see, as we got up in altitude the weather was colder and colder; and when nearing the Grand Canyon there is considerable danger of being snowed under; and this, in a locality that is almost entirely uninhabited, would be risky and dangerous. Rather sadly we turned our horses from the well-beaten road, and headed toward the Jerome gold-mines. The locality of this mining town was plainly visible from the crest of every hill by the volumes of black smoke that seemed to surround and envelop the neighborhood. Down into the valley we went over a very pretty and romantic road until we crossed again the Verde River. Then began our gradual ascent over a good road up toward the mines. The road was so fine I tried my wheel, and rode several miles. Finally I stopped to rest. As my companions came up I said:

"Why, I do not see what makes me get so tired. I have had a beautiful road; and although I have not ridden more than about two miles, it really seems as if I hadn't strength to go any further."

This remark was greeted with a laugh from my comrades on the wagon. One of them said:

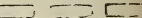
"Why, Mr. Root, instead of two miles you have made six or seven, and, besides this, going up hill at a tremendous rate pretty much every foot of the way. We are now within a few miles of the great incline that takes us up to the city. By all means, get on and ride, and get rested enough so you will be able to foot it up the great hill."

It began to be evident, as we came nearer and nearer, that we were getting into the suburbs of a town of some sort. The dwellings were better, and there were slight evidences of wealth on every side. At a most romantic notch in the mountains we came in view of the incline. Said I:

"Why, you do not mean that the horses and wagons go up that hill?"

"Indeed they do, and carry heavy loads too, as you will presently see."

Our ponies were watered, and the sagacious animals looked anxiously up at the task that lay before them. The road was so hard and smooth it was not so *very* hard after all; but it was a terribly long pull, not only on the horses, but our whole crowd were puffing and panting as we reached a turn that gave us the first glimpse of the city. Jerome is built on the side of a cliff. I think it has between one and two thousand inhabitants. The dwellings are notched into the side of the mountains all along. The streets are necessarily very narrow, for one side must be cut into the rocky mountain side, while the other is built out by a wall. The houses are so much one above another that you can not only look down your neighbor's chimney, but many times you could easily jump down, or at least it would almost seem so. There is one single church in the town, built by the Baptists; and I verily believe it cost about as much to put up a structure of timbers to hold the projecting edge of the building as to make the building itself. Every house has one edge jutting into the rocky mountain side; then the other is propped on a

stone wall or on timbers. There is only one street in the town wide enough for a wagon. The others are mere walks, or walks wide enough to accommodate a burro. Said burros deliver provisions, fuel, and every thing else. Instead of having streets go up and down the mountain, they have an endless amount of stairways. The town is supplied with electric lights, and waterworks. There is not any sewage at present, and it may be a little difficult to manage it; for slops and rain water will go straight down hill any way. The tank that supplies the town with water is a hundred feet or more above it; in fact, it is so high up that it looks like a good-sized barrel; but it really holds enough for all purposes. 

It was toward dusk when we got in, and before reaching the residence of my good friend F. E. Jordan I caught a glimpse of the wonderful pyrotechnic displays that can always be seen day and night. Great tubs of melted slag are constantly being poured out over the cliff as they are carted out from the great Jerome gold and copper mines. In fact, the company is constantly making a level platform on the edge of the mountain, with the molten slag. A guard is placed around the melted *lava* (as I should call it), so that it cools on a perfect level, hard and smooth as ice, and as firm as the rocks. More slag is then poured over the edge of the cliff until it accumulates for a groundwork, and the floor thus laid is used for building out the constantly increasing works of the mining company.

My friend Jordan used to be a bee-keeper at Camp Verde. He has taken GLEANINGS many years, and bought goods of us until he feels perfectly well acquainted. He occupies a very pretty little cottage, one of the three latest built, and almost the highest up in the town of Jerome. Within his beautiful home we found quite a contrast to camping out in the desert. After supper he kindly piloted us over the works of the great mining company. It is impossible to do any thing like justice here on paper, but I will try to give you a little sketch of it.

Years ago a mining company located here and dug out a small quantity of copper ore containing some gold. They supposed they had exhausted the mine, and it was entirely or partly abandoned. This new company, by going a few feet further into the mountains, discovered endless quantities of copper ore—I think some of it going as high as 75 or 80 per cent pure copper. A shaft was sunk down 500 feet or more, and they found ores in paying quantities clear to the bottom. Out of this shaft drifts were led out at different levels. The ore is mined, and placed on cars which are run up to the bottom of the shaft, then it is elevated to a room level with the mines. The cars run right up the elevator, and the contents are then pushed off into the melting-furnaces. The ores, with the proper materials, are dumped into a huge cupola, similar to that used for melting iron. This is mixed with a sufficient quantity of coke, and by the assistance of a tremendous blast of air the whole is raised to such a great heat that the metals run out. This melted metal is conducted into a great pot or crucible. These pots are large enough—well, I think some of them would accommodate a good-sized family, tea-table and all. By means of a powerful crane, operated by electricity, these great caldrons of seething metal are tipped up as one would tip a coffee-pot, and the contents poured into brick-shaped molds. These bricks of copper ingots contain more or less gold; but none of the workmen, nor anybody but the assayer,

knows any thing about it positively. While they are pouring out the melted metal you will notice a man with a little ladle about the size of a teacup. He keeps dipping this in for a sample, as it were. These samples are given to the assayer, so that the company has at least some knowledge of the value of the metal they are mining and shipping every day. The works run day and night, week days and Sundays as well. There is no stopping.*

After we were tired of exploring this wonderful industrial plant away off in the wilderness of Arizona, we rested from our labors (climbing up and down), and waited until next morning.

At this point I was reluctantly obliged to bid adieu to my good friends Elvey and Carey, who had been with me so long. They said that, with the bad cold I had, I must not undertake to go home by the route we came; and it is well I did not, for they encountered some storms on the way that would have been at least a little trying to a "tenderfoot." My good friend Jordan got off from duty during the afternoon, and we had a rare time in exploring by daylight.

I said the ores were taken from the mine and dumped into the furnace. This is true of only a part of them. The greater part are run out of the drifts on cars along the track that runs around the mountain-side on a dead level. All along this track are heaps of roasting ore. The ore (sulphuret of copper) is piled up with alternate layers of wood. When the wood is ignited the ore contains sulphur enough to keep it burning. In fact, sometimes the sulphur runs out and runs around loose. I suppose there is not demand enough for it at the Jerome mines so that it would pay for refining and sending to market. This roasting process is in order to get rid of the sulphur and other waste products if I am correct. The fumes of the burning sulphur are so strong that no plant, tree, shrub, or bush can live near or around the town of Jerome. Mrs. Jordan told me that some of the women brought house-plants, and kept them alive for a certain length of time; but when the wind changed so as to blow the sulphur fumes the right way, every thing in the way of vegetable life gave it up. The first inquiry a stranger makes is whether or not these sulphur fumes are unwholesome. Well, the people claim they are not. How nice it is that folks should be so loyal to their own town and climate! My companion told me that people suffering from catarrh or throat troubles were found to be greatly benefited. I remembered then that our good friend E. T. Abbott, of St. Joseph, Mo., when talking at farmers' institutes, recommended sulphur fumes for curing poultry of the roup. I heard him remark that, if you had a very bad cold, nothing would give you relief quicker than to inhale the fumes of the sulphurous acid while you are treating the poultry. I remembered, too, I took particular pains to see what effect it had on my cold, and I was obliged to confess that it gave at least temporary relief. I am inclined to think the fumes of burning sulphur are not necessarily deleterious.

Well, one of the most wonderful things about the Jerome gold-mine is a spring of water that runs out in considerable quantity from the lower drift. The water runs out beside the

track. It is carried into a wooden flume something like the irrigating-flumes; and this wooden flume runs along the mountain side pretty nearly level for a mile or more. The flume is perhaps ten or twelve feet wide, and the water in the bottom is several inches deep. Now, on the bottom of this flume they have laid all sorts of pieces of refuse old iron. The water from this spring from the mine is considerably impregnated with sulphate of copper, or blue vitriol, as it is generally called. Perhaps many of our friends have observed that, when they dip a bright piece of iron or steel—say a knife-blade—into a solution of sulphate of copper, the blade soon becomes coated or plated with copper. When you are spraying fruit-trees with the copper sulphate, you may have noticed this. The explanation is that the sulphuric acid has a stronger liking for the iron than for the copper; so it lets go of the copper, as it were, and grasps hold of the iron, which is an easy solvent. The copper must go somewhere, so it is left on the surface of the iron. Cast-iron articles are often copper-coated by this means. Well, at this Jerome mine the copper is held in solution in such quantities that the iron causes it to drop the copper, not only all over the iron articles, but even on the bottom of the wooden flume. Every little while this loose mass of copper dust or mud is shoveled up. When they get a carload or more it is melted down, and it gives ingots of almost pure copper. Strangely enough—at least it was strange to me—this precipitated copper *also* contains a percentage of gold; and my friends told me that a sharp Yankee down by the Verde River had commenced speculating on his own hook by precipitating an additional quantity of copper from Copper Creek after the Jerome mine had got through with it and let it go to waste. Before the mine was ever discovered, people knew this spring and called it Bitter Spring because no man or animal could drink the water. Now this spring yields a mint of money when you get it out, by chunks of old iron, in the way I have described. Of course, there is a great deal I did not understand at all about the Jerome mine; and even Mr. Jordan himself could not enlighten me on all points. For instance, when I was in the jewelry business (years ago) I learned chemistry enough so that I could extract all the gold, by means of acids, from old jewelry of any sort. This was done by dissolving out the cheaper and baser metals by acids, and recovering the gold by quicksilver. Now, then, if 100 lbs. of copper contains one ounce of gold, how do the folks at the mint, or other metallurgists, get this one ounce of gold and save the copper also? Surely they do not dissolve this quantity of copper in acids, then precipitate it and restore it to its metallic state. If I understand chemistry, this would cost ever so much more than the copper is worth. Can any of our readers enlighten us on this point? □

A word about gold-mining. Almost every man in Arizona (and perhaps a good many women and children besides) has been more or less affected at different periods in his life by the gold-mining mania. People are prospecting everywhere, sending samples to the assayers, taking out claims, and selling their chances on said claims. One night by the camp-fire an old miner told me that it was his opinion there were not more than a dozen gold-mines in the whole of Arizona that were really paying expenses. He said, furthermore, that not one of a thousand of the prospecting miners succeeds in making even day's wages, counting all the time they spend at the business. At one point in our travels Mr. Elvey pointed out a mountain-side where he said he had on a for-

*The machinery and fixtures of this mine are said to have cost about a million of dollars; and the company claims that there is ore enough now in sight to keep them at work for the next fifty years. An English syndicate that talked about buying them out was told that no proposition could be considered short of about *sixty millions of dollars*. I shall have more to tell you about this copper-mine in our next issue.

mer trip seen a dozen men hunting over the gulches and ravines after a heavy rain, to find the precious metallic gold that had been washed out by the storm. I asked him if he did not think it likely that I might find just a *little bit* of gold if I went on foot up some of the dry canyons while the horses were climbing some of the hills. He said it was possible, but he did not think it very probable. Off I started. He told me the gold, being so heavy, it would be clear down to the bottom, under every thing else; and sometimes a little nugget would get stuck in a narrow crevice in the rock, right in the bottom of the run. I soon became full of enthusiasm, and pictured to myself holding up a nugget the size of a small hen's egg, and telling my friends that I myself picked that out of the ravine while I was off on that ride to the Grand Canyon. As I got tired a little I thought a lump of gold the size of a *hickorynut* would have satisfied me very well; then a little later I concluded I would go home satisfied if I could get a piece as large as a pea. Finally I fished my spectacles out of my pocket, and concluded I would try very hard to be satisfied if I could only show to the admiring ones at home a piece of gold of *any size* that I found in the mountains. When I was about tired out I discovered the wagon was waiting. As I reached my friends, panting from my exertions, I announced my convictions something as follows:

"Look here, friends, I have looked everywhere, and worked hard, and I have not been able to find a piece of gold even as large as a pinhead, and I have spent as much as *twenty or thirty minutes* of time, and looked very sharp. I believe I shall hereafter try to make my money in some other way."

They greeted my announcement with a great deal of pleasantry, especially when they remembered my sudden enthusiasm for gold-hunting, and how quickly it had vanished.



BUFFALO BERRY, HIGH-BUSH CRANBERRY, ETC.

I do not know but I shall have to take back some of my severe strictures in regard to a few of these small fruits. High-bush cranberry certainly was not fit to eat last fall; but after the fruit had remained on the bushes all winter, looking very pretty and ornamental, I found the bitter taste had largely disappeared, and along the last of March Mrs. Root made some jelly or marmalade of some of the berries, that was to me quite delicious and wholesome. Why didn't the nurserymen tell us that the fruit should be left on the bushes all winter, and made into some sauce in the spring? The buffalo berry this year was in bloom the first of April—in fact, before the bush had leaves on. If it comes any thing near being equal to *Eleagnus longipes*, I should be much pleased. Another thing that gives me courage is my Logan berries. These have wintered over all right, and are leafing out quite profusely. They will probably bear this season. The strawberry-raspberry is also starting up out of the ground quite thrifty and strong. The wonderful May-berry does not look quite so promising, but we are beginning to take courage. The Japanese wine-berry has been killed during the winter, except several inches of the wood belonging to the tips that took root last

fall. May be we shall be able to get a few berries from these.

THE IGNOTUM TOMATO.

Our veteran seedsman, J. H. Gregory, of Marblehead, Mass., on his experimental grounds last season, tested 45 different varieties of tomatoes. In the account given of this experiment, in a recent issue of the *American Agriculturist*, we find the following:

If I were asked what one variety for both market and home use I would select out of the entire lot tested in the experimental plot, and combining in the largest proportion all the most desirable traits, I should incline to select the Ignotum.

The above is exceedingly gratifying, especially as your humble servant had the honor of first giving the Ignotum to the world; and I have just interviewed our boys in regard to the matter. While the Ignotum many times seems to be about equal to any other, there are seasons when we are inclined to give the preference to some of the other kinds mentioned in our catalog. For instance, the Earliest in the World tomato is quite a little ahead of the Ignotum in earliness, but is small. Dwarf Champion and Livingston's Beauty are of a brighter color that takes the eye of many; and Livingston's New Stone, for a late tomato, is sometimes larger and of a little better shape.

THE "NEW CELERY CULTURE;" AN IMPROVEMENT ON IT.

From a recent number of the *Farm and Fireside* we take the following, which is high-pressure gardening, and no mistake:

Those who have tried to grow celery for market by the method known as the "new celery culture" have probably found it difficult to blanch it perfectly. Boards can not be easily used for blanching it when the rows are so close together. They have also found that, unless large quantities of fertilizers and water are supplied, the bunches are too small to be marketable, and that frequent irrigation is required because of the rapid escape of moisture during the long hot days in summer. I think I have developed some methods by which these difficulties have been largely overcome. My experiments were not very satisfactory with the "new celery culture" until last year, when I grew very fine celery in rows at an average distance of one foot apart. Some of this celery, marketed at a fancy price to some of the summer resorts near my village, paid me at the rate of five thousand dollars an acre; and from one large plot of early celery I realized at the rate of between two thousand and three thousand dollars an acre. I am so well satisfied with the results of my plan that I shall use it in my large celery field this year. The plot on which the celery was grown had received a heavy dressing of stable manure for several successive years, and was very rich. Another dressing was applied last spring and plowed in, then the ground was finely harrowed and smoothed with a light plank drag, and White Plume celery-plants set in May. Instead of setting the plants in rows one foot apart, as had been my custom, I set two rows six or seven inches apart, leaving an eighteen-inch space between the double rows. My plan was to board two rows together in blanching the celery, and to leave a space wide enough to walk in when placing the boards. The most of the cultivating was done with a wheel-hoe until the plants were eight or ten inches high, when the blanching-boards were set up and held in place by crosspieces notched and set over the top of the boards. It is very important that the boards be kept well apart until the celery has nearly reached its growth, for the leaves must be kept exposed to the air and sunlight. Near the celery-field is a large brook. Water from this was elevated into a large tank, and used for irrigating purposes. Iron pipes were laid from this tank over the celery-field, with hose attachments every few rods. In this tank I placed some loosely made bags filled with poultry manure. After the water had been allowed to stand a day or two it was distributed along between the celery rows with the hose. To retain the moisture and keep the ground from baking, the eighteen-inch space between the